ORDER NO. HAD8706179C2

# Service Manual

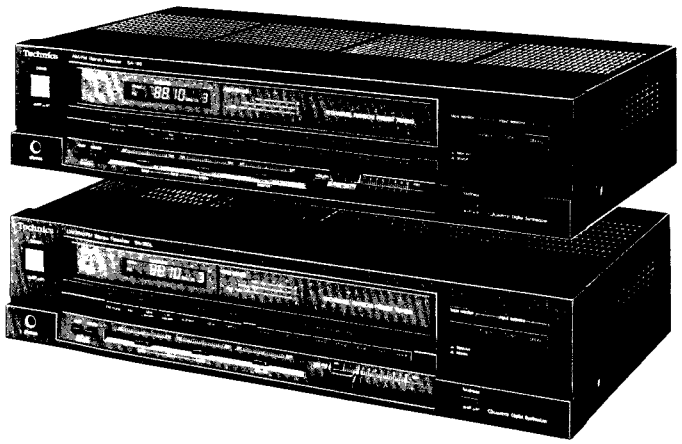
Receiver

QUARTZ Synthesizer AM/FM Stereo Tuner Receiver **SA-180**
(SA-180)

QUARTZ Synthesizer LW/MW/FM Stereo Tuner Receiver **SA-180L**
(SA-180L)

**Color**

| |
|---|
| (S) .....Silver Type |
| (K) .....Black Type |



(SA-180)

(SA-180L)

**Area**

| color | area |
|---|---|
| (S)(K) | (EX) .....Continental Europe. (SA-180) |
| (K) | (EK) .....United Kingdom. (SA-180L) |
| (S)(K) | (EB) .....Belgium. (SA-180L) |
| (S)(K) | (EH) .....Holland. (SA-180) |
| (S)(K) | (EF) .....France. (SA-180L) |
| (S)(K) | (EW) .....Switzerland. (SA-180L) |
| (S)(K) | (Ei) .....Italy. (SA-180) |

## SPECIFICATIONS

(DIN 45 500)

### ■ AMPLIFIER SECTION

| | |
|---|---|
| **1 kHz continuous power output** | |
| **both channels driven** | 2 x 35W (8Ω) |
| **Total harmonic distortion** | |
| **half power at 1 kHz** | 0.07% (8Ω) |
| **Intermodulation distortion** | |
| **rated power at 60 Hz: 7 kHz = 4:1, SMPTE, 8Ω** | 0.5% |
| **Power bandwidth** | |
| **both channels driven, -3 dB** | 10 Hz~ 40 kHz (8Ω) |
| **Damping factor** | 20 (8Ω) |
| **Input sensitivity and impedance** | |
| **PHONO** | 2.5 mV/ 47 kΩ |
| **CD/ AUX, TAPE/ EXT** | 150 mV/ 22 kΩ |
| **PHONO maximum input voltage (1 kHz, RMS)** | 150 mV |
| **S/ N** | |
| **rated power (8Ω)** | |
| **PHONO** | 70 dB (IHF, A: 72 dB) |
| **CD/ AUX, TAPE/ EXT** | 88 dB (IHF, A: 95 dB) |
| **Frequency response** | |
| **PHONO** | RIAA standard curve ±0.8 dB (30 Hz~ 15 kHz) |
| **CD/ AUX, TAPE/ EXT** | 10 Hz~ 70 kHz (-3 dB) |
| **Tone controls** | |
| **BASS** | 50 Hz, +10 dB~ -10 dB |
| **TREBLE** | 20 kHz, +10 dB~ -10 dB |
| **Loudness control (volume at -30 dB)** | 50 Hz, +9 dB |
| **Output voltage** | |
| **REC OUT** | 150 mV |
| **Channel balance, 250 Hz~ 6,300 Hz** | ±1 dB |
| **Channel separation, 1 kHz** | 55 dB |
| **Headphones output level and impedance** | 390 mV/ 330Ω |
| **Load impedance** | |
| **MAIN or REMOTE** | 8Ω~ 16Ω |
| **MAIN and REMOTE** | 8Ω~ 16Ω |

### ■ FM TUNER SECTION

| | |
|---|---|
| **Frequency range** | 87.50~ 108.00 MHz |
| **Sensitivity** | |
| **S/ N 30 dB** | 1.5 µV (75Ω) |
| **S/ N 26 dB** | 1.3 µV (75Ω) |
| **S/ N 20 dB** | 1.2 µV (75Ω) |
| **IHF usable sensitivity** | 1.5 µV (IHF '58, 75Ω) |
| **IHF 46 dB stereo quieting sensitivity** | 22µV/ 75Ω |
| **Total harmonic distortion** | |
| **MONO** | 0.15% |
| **STEREO** | 0.3% |
| **S/ N** | |
| **MONO** | 60 dB (75 dB, IHF) |
| **STEREO** | 58 dB (71 dB, IHF) |
| **Frequency response** | 20 Hz~ 15 kHz, +1 dB~ -2 dB |
| **Alternate channel selectivity** | ±400 kHz, 65 dB |
| **Capture ratio** | 1.0 dB |
| **Image rejection at 98 MHz** | 40 dB |
| **IF rejection at 98 MHz** | 70 dB |

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

| | |
|---|---|
| **Spurious response rejection at 98 MHz** | 70 dB |
| **AM suppression** | 50 dB |
| **Stereo separation** | |
| **1 kHz** | 40 dB |
| **10 kHz** | 30 dB |
| **Carrier leak** | |
| **19 kHz** | -30 dB (-35 dB, IHF) |
| **38 kHz** | -45 dB (-50 dB, IHF) |
| **Channel balance (250 Hz~ 6,300 Hz)** | ±1.5 dB |
| **Limiting point** | 1.2 µV |
| **Bandwidth** | |
| **IF amplifier** | 180 kHz |
| **FM demodulator** | 1000 kHz |
| **Antenna terminals** | 75Ω (unbalanced) |

### ■ AM TUNER SECTION (SA-180)

| | |
|---|---|
| **Frequency range** | 522~ 1611 kHz (9 kHz-step)<br>530~ 1620 kHz (10 kHz-step) |
| **Sensitivity (S/ N 20 dB)** | 20 µV, 330 µV/ m |
| **Selectivity** | 55 dB |
| **Image rejection at 999 kHz** | 40 dB |
| **IF rejection at 999 kHz** | 55 dB |

### ■ AM TUNER SECTION (SA-180L)

| | |
|---|---|
| **Frequency range** | |
| **MW** | 522~ 1611 kHz (9 kHz-step)<br>530~ 1620 kHz (10 kHz-step) |
| **LW** | 155~ 353 kHz (153~ 351 kHz, -2 kHz shift) |

| | |
|---|---|
| **Sensitivity (S/ N 20 dB)** | |
| **MW** | 20 µV, 330 µV/ m |
| **LW** | 45 µV |
| **Selectivity** | |
| **MW (at 999 kHz)** | 55 dB |
| **LW (at 254 kHz)** | 55 dB |
| **Image rejection** | |
| **MW (at 999 kHz)** | 40 dB |
| **LW (at 254 kHz)** | 40 dB |
| **IF rejection** | |
| **MW (at 999 kHz)** | 55 dB |
| **LW (at 254 kHz)** | 40 dB |

### ■ GENERAL

| | |
|---|---|
| **Power consumption** | 200W |
| **Power supply** | |
| **For United Kingdom** | AC 50 Hz/ 60 Hz, 240V |
| **For continental Europe** | AC 50 Hz/ 60 Hz, 220V |
| **Dimensions (W X H X D)** | 430 X 97 X 243 mm<br>(16-15/ 16" X 3-13/ 16" X 9-9/ 16") |
| **Weight** | 4.5 kg (9.9 lb.) |

**Note:**
Specifications are subject to change without notice.
Weight and dimensions shown are approximate.

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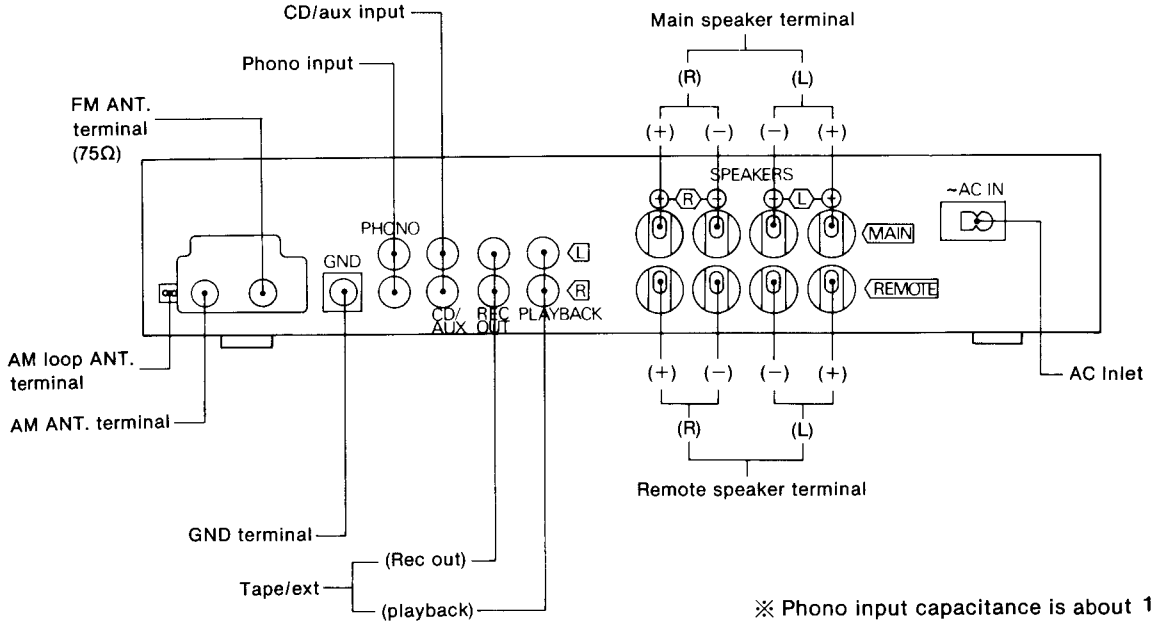
## ■ LOCATION OF CONTROLS

### • Rear panel (SA-180/SA-180L)

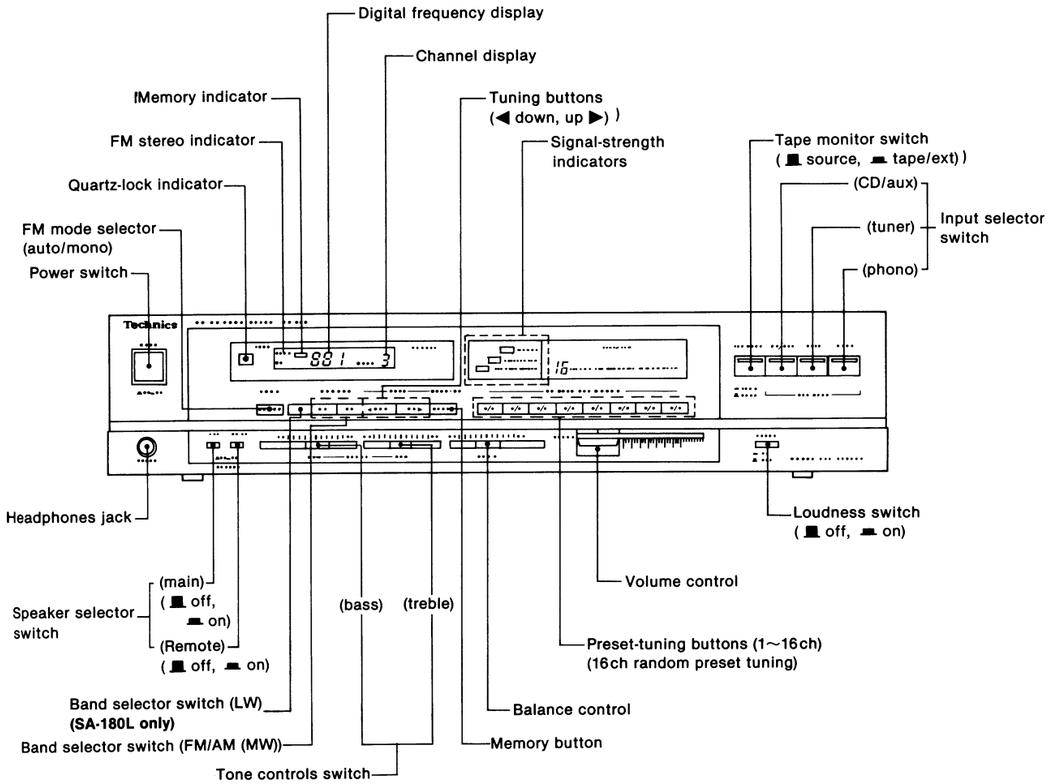



※ Phono input capacitance is about 100pF.



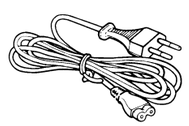
D

• **Front panel (SA-180/SA-180L)**

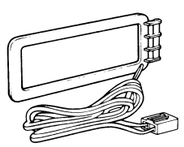



## ■ ACCESSORIES

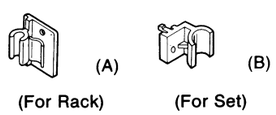
- AC power supply cord ..... 1
  (SFDAC05E02 [EB])
  (SFDAC05E03 [EX, EH, Ei, EW, EF])
  (SFDAC05G02 [EK])



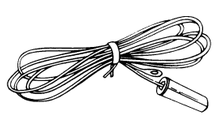
- AM loop antenna ..... 1
  (SSA902-5)



- AM antenna holders ..... 2
  (SMA233-1) (A) (For Rack)
  (SMA231) (B) (For Set)

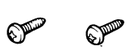


- FM indoor antenna ..... 1
  (SSA270M)



- Attachment plug ..... 1
  (For United Kingdom only)
  (SJP9009)

- Screws ..... 2
  (XTN3+10AFZ)





## ■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted", or if speaker systems with an impedance less than the indicated rated impedance of the amplifier are used.

If this occurs, follow the procedure outlined below.

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again.

**Note:**
When the protection circuitry functions, the unit will not operated unless the power is first turned off and then on again.

## ■ BEFORE REPAIR AND ADJUSTMENT

1. Turn off the power, Discharge both power supply capacitors (C703, C704 8200μF) through a 10Ω 5W resistor to ground. Do not short between C703 and C704. It may damage the capacitors.
2. After completion of repair, slowly apply the primary voltage by using a variac to avoid over current. Current consumption at 50Hz/60Hz in no signal mode should by shown with respect to supply voltage 220V/240V.

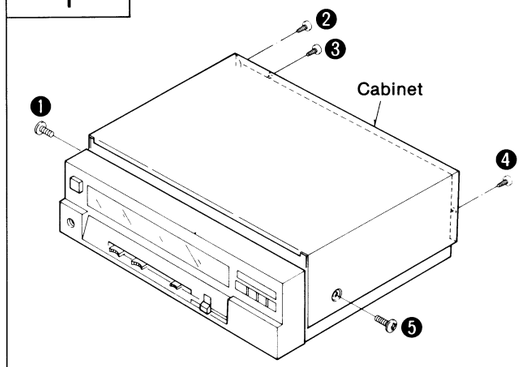
| Power supply voltage | | 220V | 240V |
|---|---|---|---|
| Consumed current | 50/60Hz | 90~230mA | 80~220mA |

## ■ DISASSEMBLY INSTRUCTIONS

**Ref. No. 1** — **How to remove the cabinet**

**Procedure 1**

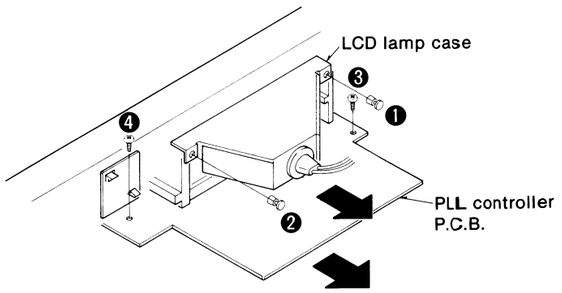
1. Remove the 5 screws (❶~❺).




**Ref. No. 3** — **How to remove the PLL controller P.C.B.**

**Procedure 1→3**

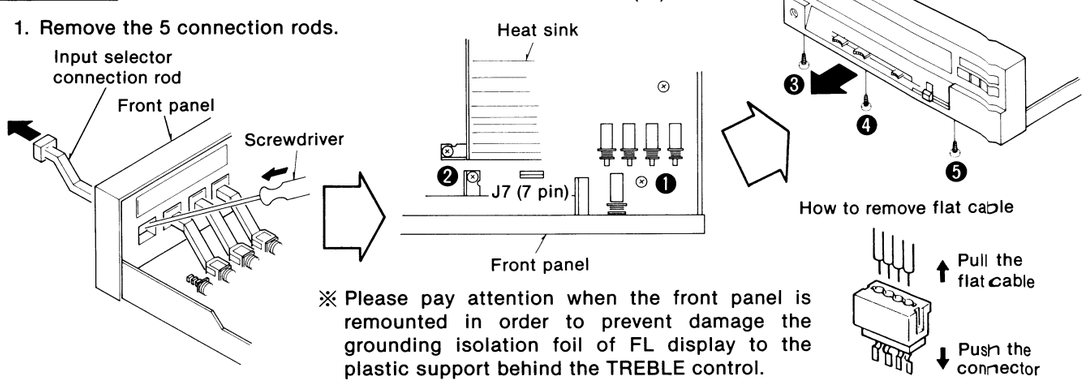
1. Remove the 2 lock pins (❶, ❷) of LCD lamp case.
2. Remove the 2 screws (❸, ❹) of PLL controller P.C.B.




**Ref. No. 2** — **How to remove the front panel**

**Procedure 1→2**

1. Remove the 5 connection rods.
2. Remove the 2 screws (❶, ❷).
3. Pull the 1 connection (J7).
4. Remove the 3 screws (❸~❺).

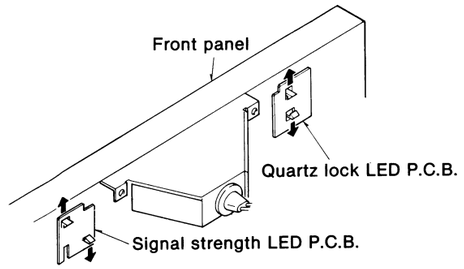



※ Please pay attention when the front panel is remounted in order to prevent damage the grounding isolation foil of FL display to the plastic support behind the TREBLE control.

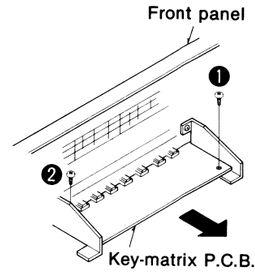


D

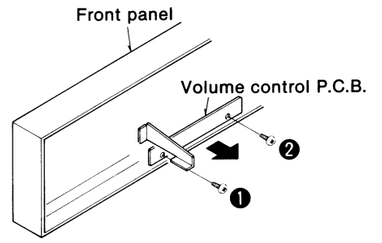
| Ref. No. 4 | How to remove the quartz lock LED P.C.B. and signal strength LED P.C.B. |
|---|---|
| Procedure 1 → 2 → 4 | 1. Remove the 2 tabs of quartz lock LED P.C.B. and signal strength LED P.C.B. |

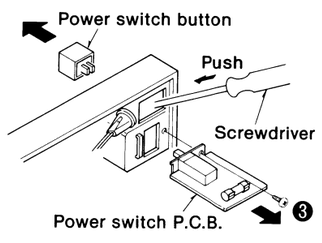



| Ref. No. 5 | How to remove the key-matrix P.C.B. |
|---|---|
| Procedure 1 → 2 → 5 | 1. Remove the 2 screws (❶, ❷) of key-matrix P.C.B. |

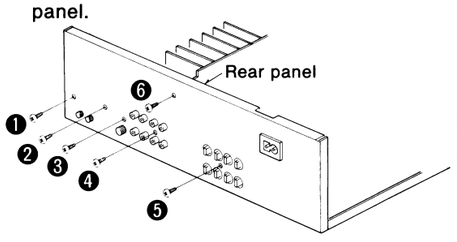


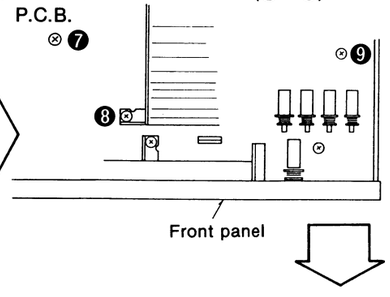

| Ref. No. 6 | How to remove the volume control P.C.B. and power switch P.C.B. |
|---|---|
| Procedure 1 → 2 → 6 | 1. Remove the 2 screws (❶, ❷) of volume control P.C.B.<br>2. Remove the power switch button and screw (❸) of power switch P.C.B. |

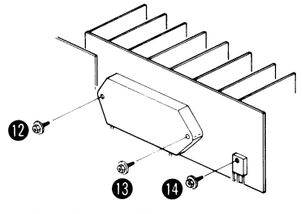


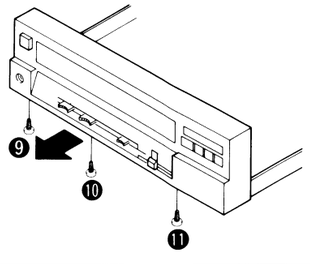




| Ref. No. 7 | How to remove the power IC and regulator transistor |
|---|---|
| Procedure 1 → 7 | 1. Remove the 6 screws (❶~❻) of rear panel.<br>2. Remove the 3 screws (❼~❾) of main P.C.B.<br>3. Remove the 3 screws (❾~⓫) of front panel.<br>4. Unsolder the power IC or regulator transistor.<br>5. Remove the 3 screws (⓬~⓮). |



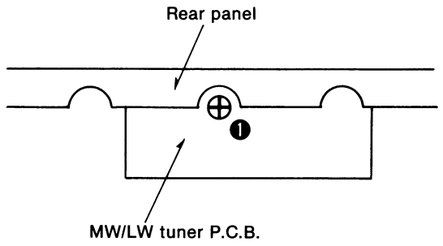




• When mounting the Power IC.
IC apply silicone compond (SZZ0L15) to the rear side of Power IC.

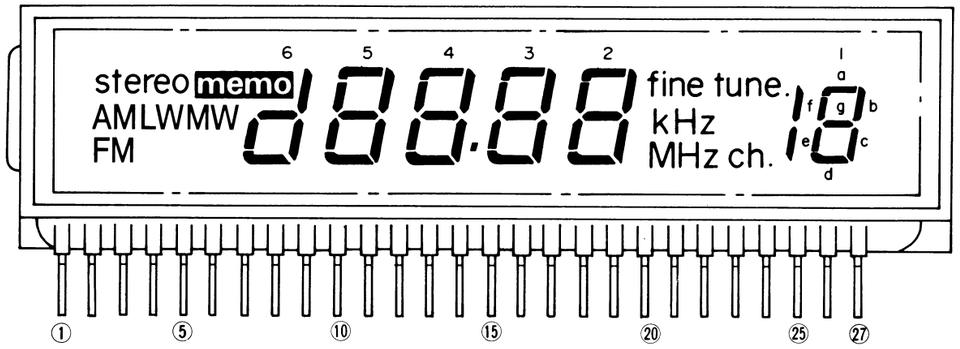


D

| Ref. No. 8 | How to remove the MW/LW tuner P.C.B. for ST-180L. |
|---|---|
| Procedure 1→8 | 1. Remove the 1 screw (❶). |




## ■ DESCRIPTION OF LCD PANEL



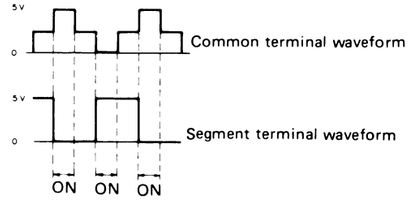

① ⑤ ⑩ ⑮ ⑳ ㉕ ㉗

**Common terminal – ①, ②  Segment terminal – ③ ~ ㉗**

| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COM 1 | COM 1 | — | MEMO | — | AM | — | FM,MHz | 6b | 5f | 5e | 5d | 5a | 4f | 4e |
| COM 2 | — | COM 2 | — | LW | — | MW | 6d,e,g | 6c | 5b | 5g | 5c | — | 4b | 4g |

| No. | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COM 1 | 4d | 4a | 3f | 3e | 3d | 3a | 2a,c,d,f | kHz | stereo | ch | 1d | 1e | 1f |
| COM 2 | 4c | ▰ | 3b | 3g | 3c | 2b,e | 2g | finetune | / | 1a | 1c | 1g | 1b |

**Lighting timing:**
It turns on when the difference in voltage between common and segment terminals is 5V (VDD).



## ■ MEASUREMENTS AND ADJUSTMENTS

### ■ AM/FM(SA-180)
### LW/MW/FM(SA-180L)

**Control positions and equipment used**

- AM and FM signal generator(AM and FM-SG)
- Stereo modulator
- Distortion analyser
- Oscilloscope
- AC and DC electronic voltmeter(EVM)
- Frequency counter
- Choke coil(100μH)
- Resistor(100kΩ)
- Ceramic capacitor(200pF)

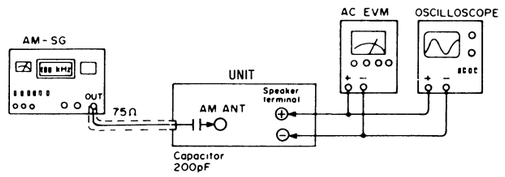
**Note:** Fro **T201** (AM-IFT) and **L205** (AM OSC coil), adjust parts are supplied. (SA-180)
For **T201** (MW-IFT), **L204** (LW-IFT) and **L205** (MW OSC coil), adjust parts are supplied. (SA-180L)
So, do not turn the cores of the parts.

### AM(MW)-RF ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Set the unit to **"AM(MW)"** position.
3.Place the radio dial and signal generator setting to **610kHz**.
4.Adjust **L204** for maximum output. **(SA-180)**
4.Adjust **L203** for maximum output. **(SA-180L)**
5.Place the radio dial and signal generator setting to **1500kHz**.
6.Adjust **CT201** for maximum output.
7.Repeat steps 3.~ 6.

**Note:** Antenna input level must be as low as possible being free from AGC.

AM SIGNAL GENERATOR CONDITION
Modulation .....30%
Modulation frequency .....400Hz

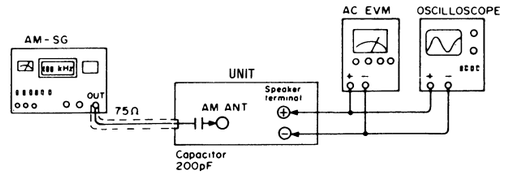



### LW-RF ADJUSTMENT (SA-180L only)

1.Test equipment connection is shown in figure.
2.Set the unit to **"LW"** mode.
3.Place the radio frequency display and signal generator setting to **155kHz**.
4.Adjust **L206** for maximum output.
5.Place the radio frequency display and signal generator setting to **353kHz**.
6.Adjust **CT202** for maximum output.
7.Repeat steps 3.~ 6.

**Note:** Antenna input level must be as low as possible being free from AGC.

AM SIGNAL GENERATOR CONDITION
Modulation .....30%
Modulation frequency .....400Hz

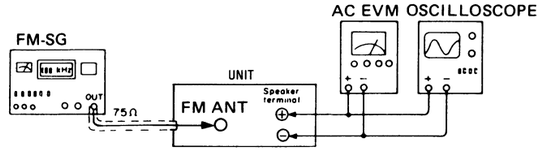



### FM-RF ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Place unit into **"FM"** position.
3.Place the radio dial and signal generator setting to **90.10MHz**.
4.Adjust **L106** for maximum output.
5.Place the radio dial and signal generator setting to **106.10MHz**.
6.Adjust **CT101** for maximum output.
7.Repeat steps 3 ~ 6.

**Note:** As three output reading will be present, adjustments must be made at center frequency.

FM SIGNAL GENERATOR CONDITION
Modulation .....100%
Modulation frequency .....400Hz
Output level.....66dB



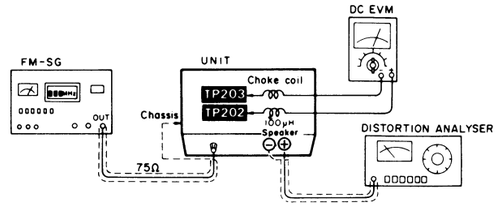



### FM MONO DISTORTION ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Set the unit to **"FM"** position.
3.Place the radio frequency display and signal generator setting to **100.10MHz**.
4.Adjust **T202** core so that voltage measured in signal mode is **0mV(0±20mV)** in 300mV range. **(SA-180)**
4.Adjust **T203** so that the distortion factor of Lch is minimized. **(SA-180L)**
5.Repeat steps 4 and 5 a few times.
6.Make sure that the distortion factors of L-CH and R-CH are nearly the same with each other to minimum.

**Note:** The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation .....100%
Modulation frequency .....400Hz
Output level.....72dB



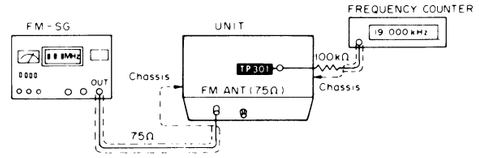

### MPX VCO ADJUSTMENT (FREE RUN)

1.Test equipment connection is shown in figure.
2.Place unit into **"FM auto"** position.
3.Place the radio dial and signal **generator** setting to **100.10MHz**.
4.Adjust **VR301** for **19kHz±30Hz** on frequency counter reading.
5.Tune a stereo broadcast and confirm the frequency stays at 19kHz.

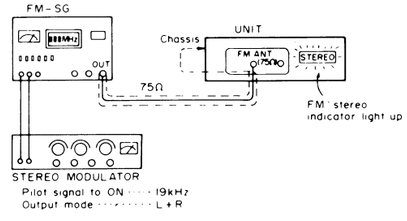
**USING ALTERNATE SYSTEM**

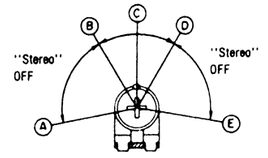
1.Apply stereo signal from generator or receive the stereo broadcast.
2.Adjust **VR301** until stereo indicator lights up. Fix the arm of **VR301** as shown in figure.

FM SIGNAL GENERATOR CONDITION
Modulation .....0%
Modulation frequency .....0Hz
Output level.....66dB




FM SIGNAL GENERATOR CONDITION
Modulation .....10%
Modulation frequency .....Pilot (19kHz)
Output level.....66dB



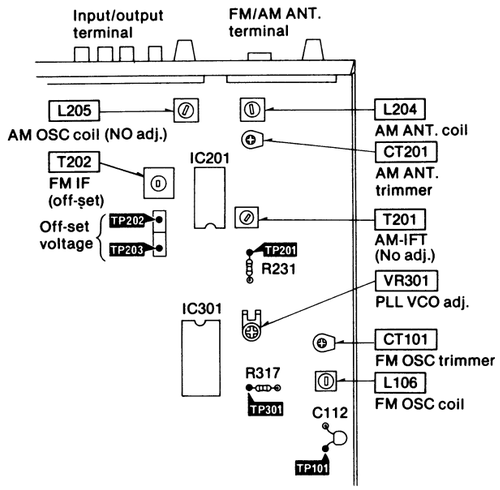




**VR301**

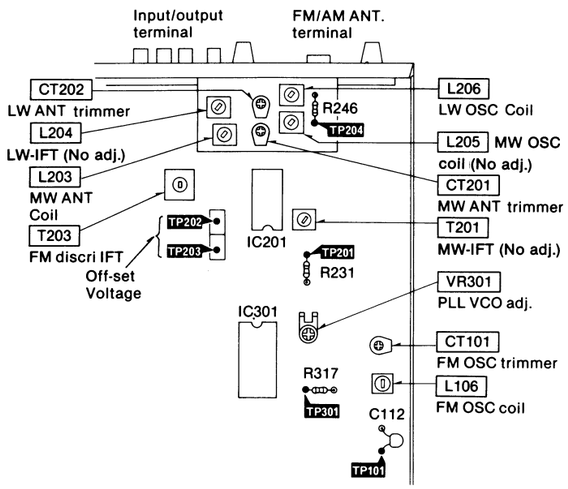
**Ⓐ−Ⓑ,**
**Ⓓ−Ⓔ..... "Stereo" OFF position**
**Ⓑ−Ⓓ..... "Stereo" ON position (Indicator lighting)**
**Ⓒ..... Adjust point of pilot circuit**

## • Adjustment point

**(SA-180)**




**(SA-180L)**

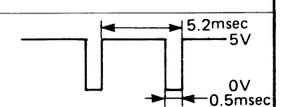
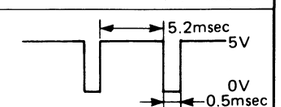
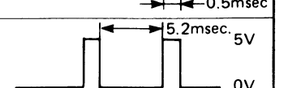





D

# ■ FUNCTION OF TERMINAL (IC901: UPD1718G512)

## • PLL CONTROLLER IC

| Pin No. | Mark | Description of terminal |
|---|---|---|
| 1 ∫ 4<br>34 ∫ 52 | LCD4 ∫ LCD1<br>LCD23 ∫ LCD5 | Segment signal output terminal for display. |
| 5 | COM2 | Common signal output terminal connected to LCD. Output is delivered in 3 values of earth, 1/2VDD and VDD (at 5 ms intervals) in a period of 50 Hz.<br>The segment turns ON when the difference in voltage is ± VDD between these terminals and LCD1 ~ LCD23. |
| 6 | COM1 | |
| 7 | VDD | Power supply terminal of device. Voltage of 5V ± 10% is supplied during operation of device.<br>To hold the internal data memory (RAM), the voltage can be decreased to 2.5V.<br>**Note:** Pins 7 and 33 are connected inside the chip. So, it is unnecessary to supply voltage to the pins. |
| 8 | FM | Input is local oscillation output (VCO) in a range of 10 ~ 130 MHz (0.3Vp-p, min.).<br>There are 1/2 fixed frequency division prescaler and 2-step (1/32, 1/33) prescaler internally.<br>Therefore, when deciding the frequency dividing value of programmable divider, it must be decided from the frequency obtained by halving the local oscillation output (VCO). |
| 9 | AM | Input is local oscillation output (VCO) in a range of 0.5 ~ 20 MHz (0.1Vp-p, min.).<br>When the mode is shifted to FM, the AM terminal voltage automatically becomes the supply voltage of device. |
| 10 | GND | Ground terminal. |
| 11 | E01 | When the divided oscillation frequency is higher than the standard frequency, H-level output is delivered from these terminals.<br>When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating. |
| 12 | E02 | |
| 13 | CE | Device selection signal input terminal. The signal level should be high when the device is operated, and low when not operated.<br>With this terminal shifted to low level, LCD (liquid crystal display) turns off and the memory is held. |
| 14 | NC | Not used in this unit. |
| 15 | X1 | Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz. |
| 16 | X2 | |
| 17 | A3 (SD) | Terminal to put in stop signal during auto tuning. The voltage is 5V with broadcast received, and 0V without broadcast received. |
| 18 | A2 | Not used in this unit. |
| 19 | A1 | FM/AM output terminal. (FM ⟶ 5V, AM ⟶ 0V) |
| 20 | A0 | Auto/mono changeover output terminal. (auto ⟶ 0V, mono ⟶ 5V)<br>LW changeover output terminal (MW→0V, LW→5V) |
| 21 ( 24 | K3 ( K0 | Input terminal for key return signal from external key matrix.   |
| 25 ∫ 28 | B3 ∫ B0 | Output terminal for key return signal from external key matrix.   |
| 29 | C3 | Output terminal for key return signal to let the stereo indicator light up.   |
| 30 | C2 | AF output signal detection terminal.<br>When AF output is higher than AC 2V, Q904 turns ON and key return signal is put into No. 24 pin. |
| 31 | C1 | FM/AM output terminal . |
| 32 | C0 | Muting signal output terminal. Muting signal is put out during operation of FM/AM selector switch and tuning switch. (4V during muting) |

# ■ RESISTORS & CAPACITORS (SA-180L)

### Numbering System of Resistor

**Example:**

| ERD | 25 | F | J | 101 |
|---|---|---|---|---|
| Type | Wattage | Shape | Tolerance | Value (100Ω) |

| ERJ | 6G | C | J | 2R2 |
|---|---|---|---|---|
| Type | Wattage | Shape | Tolerance | Value (2.2Ω) |

### Numbering System of Capacitor

**Example:**

| ECKD | 1H | 102 | Z | F |
|---|---|---|---|---|
| Type | Voltage | Value (1000pF) | Tolerance | Peculiarity |

| ECEA | 50 | M | R47 |
|---|---|---|---|
| Type | Voltage | Peculiarity | Value (0.47μF) |

| Resistor Type | | Wattage | Tolerance |
|---|---|---|---|
| ERD: | Carbon Resistor | 10 : 1/8W | F : ±1% |
| ERC: | Solid Resistor | 25 : 1/4W | G : ±2% |
| ERF: | Incombustible Box-Shaped Wire-Wound Resistor | 50 : 1/2W | J : ±5% |
| | | 18 : 1/8W | K : ±10% |
| | | 14 : 1/4W | M : ±20% |
| | | 12 : 1/2W | |
| ERG: | Metal Oxide-Film Resistor | 1 : 1W | |
| | | 2 : 2W | |
| ERM: | Wire-Wound Resistor | 3 : 3W | |
| | | S1 : 1/2W | |
| ERO: | Superstable Metal Film Resistor | S2 : 1/4W | |
| | | 6G : 1/10W | |
| | | 8G : 1/8W | |
| ERX: | Metal-Film Resistor | | |
| RRJ: ERJ: | Chip Resistor | | |

※ Capacity are in microfarads (μF) unless specified otherwise, P=Pico-farads.
※ Resistance are in ohms (Ω), unless specified otherwise, 1K=1,000Ω, 1M=1,000KΩ

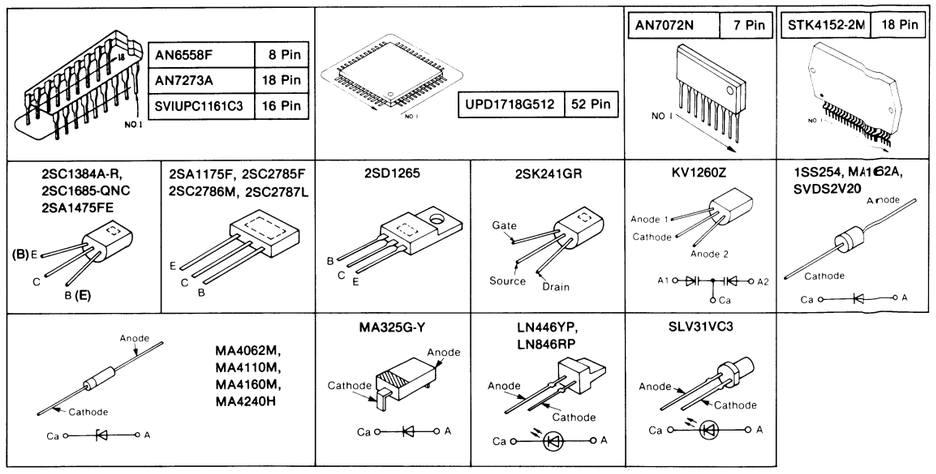
| Capacitor Type | | Voltage | Tolerance |
|---|---|---|---|
| ECCD: | Ceramic Capacitor (Chitacon) | (ECCD, ECKD Type) 1H : 50V DC 2H : 500V DC | K : ±10% |
| ECKD: | Ceramic Capacitor (Chitabari) | (ECFD Type) C : 12V DC D : 25V DC | M : ±20% |
| ECFD: | Semiconductor Ceramic Capacitor | E : 50V DC | Z : +80% −20% |
| ECE□: | Electrolytic Capacitor | (ECQ Type) 05 : 50WV DC 1 : 100WV DC | J : ±5% |
| ECS□: | Tantalum Fixed Electrolytic Capacitor | (ECE, ECS Type) 0G : 4V 0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1V : 35V 1H : 50V 1J : 63V 2A : 100V | G : ±2% F : ±1% C : ±0.25pF D : ±0.5pF |
| ECQ□: | Polystyrenc Film Capacitor | | |
| ECQS: | Polystyrene Film Capacitor | | |
| ECQS: | Polypropylene Film Capacitor | | |
| ECQV: | T.F Capacitor | | |
| ECU□: RCU□: | Chip Capacitor | | |
| ECBT: | Cylindrical Ceramic Capacitor | | |

| Ref. No. | Part No. |
|---|---|
| RESISTORS | |
| R1, R2 | ERDS2TJ391 |
| R3, R4 | ERDS2TJ224 |
| R5, R6 | ERDS2TKG5622 |
| R7, R8 | ERDS2TJ271 |
| R9, R10 | ERDS2TJ680 |
| R11, R12 | ERDS2TJ184 |
| R13, R14 | ERDS2TJ123 |
| R15, R16 | ERDS2TJ563 |
| R17, R18 | ERDS2TJ102 |
| R102 | ERDS2TJ102 |
| R103 | ERDS2TJ151 |
| R104 | ERDS2TJ471 |
| R105 | ERDS2TJ333 |
| R107 | ERDS2TJ474 |
| R110 | ERDS2TJ221 |
| R111 | ERDS2TJ391 |
| R112 | ERDS2TJ221 |
| R113 | ERDS2TJ223 |
| R114 | ERDS2TJ103 |
| R115 | ERDS2TJ222 |
| R118 | ERDS2TJ104 |
| R119 | ERDS2TJ332 |
| R120 | ERDS2TJ331 |
| R121 | ERDS2TJ562 |
| R201 | ERDS2TJ103 |
| R202 | ERDS2TJ182 |
| R203 | ERDS2TJ223 |
| R204 | ERDS2TJ822 |
| R205 | ERDS2TJ104 |
| R206 | ERDS2TJ473 |
| R207 | ERDS2TJ102 |
| R208 | ERDS2TJ563 |
| R209 | ERDS2TJ182 |
| R210 | ERDS2TJ121 |
| R211 | ERDS2TJ101 |
| R212 | ERDS2TJ561 |
| R213 | ERDS2TJ151 |
| R214 | ERDS2TJ471 |
| R215 | ERDS2TJ223 |
| R216 | ERDS2TJ563 |
| R217 | ERDS2TJ471 |
| R218 | ERDS2TJ822 |
| R219 | ERDS2TJ104 |
| R220 | ERDS2TJ153 |
| R221, R222 | ERDS2TJ122 |
| R223 | ERDS2TJ473 |
| R224, R225 | ERDS2TJ103 |
| R228 | ERDS2TJ474 |
| R229 | ERDS2TJ331 |
| R230 | ERDS2TJ824 |
| R231 | ERDS2TJ471 |
| R232 | ERDS2TJ273 |
| R234, R235 | ERDS2TJ104 |
| R236 | ERDS2TJ103 |
| R239 | ERDS2TJ334 |
| R240 | ERDS2TJ102 |
| R241 | ERDS2TJ471 |
| R242 | ERDS2TJ123 |
| R243 | ERDS2TJ222 |
| R244 | ERDS2TJ151 |
| R246 | ERDS2TJ102 |
| R248 | ERDS2TJ471 |
| R249 | ERDS2TJ153 |
| R250 | ERDS2TJ562 |
| R251 | ERDS2TJ221 |
| R252 | ERDS2TJ104 |
| R301 (EK) | ERDS1FJ221 |
| R301 (EW, EF, EB) | ERDS2TJ221 |
| R304, R305 | ERDS2TJ223 |
| R306 | ERDS2TJ334 |
| R307, R308 | ERDS2TJ332 |
| R309, R310 | ERDS2TJ104 |
| R313 | ERDS2TJ153 |
| R314 | ERDS2TJ123 |
| R315 | ERDS2TJ102 |
| R317, R318 | ERDS2TJ103 |
| R507, R508 | ERDS2TJ222 |
| R509, R510 | ERDS2TJ561 |
| R511, R512 | ERDS2TJ183 |
| R513, R514 | ERDS2TJ222 |
| R515, R516 | ERDS2TJ124 |
| R517, R518 | ERDS2TJ393 |
| R519, R520 | ERDS2TJ222 |
| R521, R522 | ERDS2TJ183 |
| R601, R602 | ERDS2TJ102 |
| R603, R604 | ERDS2TJ563 |
| R607, R608 | ERDS2TJ123 |
| R609, R610 | ERDS2TJ473 |
| R613, R614 | ERDS2TJ222 |
| R615, R616 | ERDS2TJ272 |
| R621, R622 | ERDS2TJ102 |
| R625, R626 | ERDS1FJ100 |
| R627, R628 | ERDS1FJ331 |
| R629 | ERD25FJ470 |
| R630 | ERDS1FJ391 |
| R633 | ERD25FJ1R0 |
| R634 | ERD25FJ820 |
| R634 (EW, EF, EB) | ERQ12HJ820 |
| R634 (EK) | ERDS1FJ221 |
| R635 | ERD25FJ1R0 |
| R636 | ERDS2TJ560 |
| R700 (EK) | ERX1ANJR27 |
| R701, R702 | ERD25FJ181 |
| R703 | ERDS2TJ393 |
| R704, R705 | ERX2ANJ220 |
| R706 | ERDS1FJ152 |
| R707 | ERDS2TJ821 |
| R708 | ERDS2TJ102 |
| R709 | ERDS2TJ272 |
| R710 | ERDS2TJ222 |
| R711 | ERDS1FJ152 |
| R712 | ERDS1FJ821 |
| R712 (EW, EF, EB) | ERDS2TJ221 |
| R712 (EK) | ERD25FJ470 |
| R713 | ERDS1FJ681 |
| R714 | |
| R720 (EK) | ERDS2TJ103 |
| R901 | ERDS2TJ561 |
| R903 | ERDS2TJ153 |
| R904 | ERDS2TJ332 |
| R906 | |



| Ref. No. | Part No. |
|---|---|
| R907 | ERDS2TJ473 |
| R908 | ERDS2TJ103 |
| R909 | ERDS2TJ562 |
| R910 | ERDS2TJ681 |
| R911, R912 | ERDS2TJ102 |
| R921 | ERDS2TJ221 |
| R922 | ERDS2TJ101 |
| CAPACITORS | |
| C1, C2 | ECEA1HU3R3 |
| C3, C4 | RCBS1H101KBY |
| C5, C6 | ECKD1H102KB |
| C7, C8 | ECQM1H223JZ |
| C9, C10 | ECQM1H682JZ |
| C11, C12 | ECEA1HU010 |
| C13, C14 | ECEA0JU330 |
| C104 | RCBS1H180JCY |
| C106 | RCBS1H220JCY |
| C107, C108 | RCBS1H102KBY |
| C109 | RCBS1H4R7KCY |
| C110 | RCBS1H121KBY |
| C111 | RCBS1H1R8MCY |
| C115 | RCBS1H180JCY |
| C116 | RCBS1H181KBY |
| C118, C119 | ECKD1H103PF |
| C120 | RCBS1H102KBY |
| C121 | RCBS1H6R8KCY |
| C122 | ECKD1H223PF |
| C123 | RCBS1H390JLY |
| C125 (EW, EF, EB) | RCBS1H100JCY |
| C125 (EK) | RCBS1H6R8KCY |
| C126 (EW, EF, EB) | RCBS1H1R8MCY |
| C126 (EK) | RCBS1H2R7KCY |
| C127 | RCBS1H102KBY |
| C128 | RCBS1H180JCY |
| C129 | RCBS1H1R0MCY |
| C130 | RCBS1H102KBY |
| C140 (EW, EF, EB) | ECBS1C103NYY |
| C140 (EK) | ECKD1H103PF |
| C141 | ECKD1H103PF |
| C201 | ECQM1H473JZ |
| C202 | ECCD1H180KC |
| C203 | ECQP1471JZ |
| C204 | ECQP1391JZ |
| C205 | ECEA1HU3R3 |
| C206 | ECKD1H223PF |
| C208 | ECKD1H103PF |
| C209 | ECCD1H470K |
| C211 | ECKD1H223PF |
| C212 | ECCD1H080CC |
| C213 | ECCD1H470K |
| C214 | ECEA0JU101 |
| C215 | ECEA1HU4R7 |
| C216 | ECKD1H103PF |
| C217 | ECKD1H223PF |
| C218 | ECFTD183KXL |
| C219 | ECEA1HU2R2 |
| C220 | ECEA1HU4R7 |
| C222 | ECEA1CU100 |
| C223 | ECEA1HU010 |
| C224 | ECKD1H103PF |
| C225 | ECEA1CU100 |
| C226 | ECKD1H331KB |
| C227 | ECKD1H223PF |
| C229 | ECKD1H103PF |
| C231 | ECCD1H220K |
| C232 | ECEA1CU100 |
| C301 | ECEA1CU101 |
| C304, C305 | ECEA1HUR47 |
| C306, C307 | ECFTD153KXL |
| C310 | ECQP1471JZ |
| C311 | ECEA1HU010 |
| C312 | ECFTD473KXL |
| C313 | ECEA1HU3R3 |
| C314 | ECEA1HUR47 |
| C315, C407 | ECKD1H103PF |
| C408 | ECKD1H103PF |
| C513, C514 | ECFTD332KXL |
| C515, C516 | ECFTD223KXL |
| C517, C518 | ECFTD183KXL |
| C519, C520 | ECFTD104KXL |
| C521, C522 | ECFTD563KXL |
| C523, C524 | ECKD1H331KB |
| C601, C602 | ECEA1HN4R7S |
| C603, C604 | ECCD1H101K |
| C605, C606 | ECCD1H101K |
| C607, C608 | ECEA1HS330 |
| C609, C610 | ECCD1H050CC |
| C611, C612 | ECEA1HN3R3S |
| C615 | ECEA1HU100 |
| C617 | ECEA1HS330 |
| C618 | ECEA1JU220 |
| C619 (EK) | ECFTD104KXL |
| C619 (EW, EF, EB) | ECKD1H473ZF |
| C620 (EK) | ECFTD104KXL |
| C620 | ECKD1H473ZF |
| C621, C622 (EK) | ECFTD104KXL |
| C623, C624 | ECEA1CN100S |
| C701 ⚠ | ECKDKC103PF2 |
| C702 | ECQE1104KN |
| C703, C704 | ECETS45V472U |
| C705 | ECEA0JU470 |
| C707 | ECEA1HU470 |
| C708 | ECEA1VU4R7 |
| C709 | ECEA1VU470 |
| C710 | ECKD1H103PF |
| C711 | ECEA1AU101 |
| C712, C713 | ECKD1H103PF |
| C714 | ECKD1H103PF |
| C715 | ECEA1EU101 |
| C717 | ECKD1H223PF |
| C901 | ECEA25M4R7R |
| C902 | ECKD1H103PF |
| C903 | ECEA1HU010 |
| C904 | ECKD1H223PF |
| C906 | ECCD1H470K |
| C907 | ECCD1H100KC |
| C908 | EECF5R5U473 |
| C910 | ECEA0JU471 |
| C913 | ECKD1H103PF |
| C914 | ECCD1H150KC |
| C915 | ECEA1HU3R3 |
| C916 | ECEA1HU010 |
| C918 | ECCD1H121K |
| C921 | ECEA1CU221 |
| C922 | ECKD1H103PF |
| C930 | ECEA1HU010 |

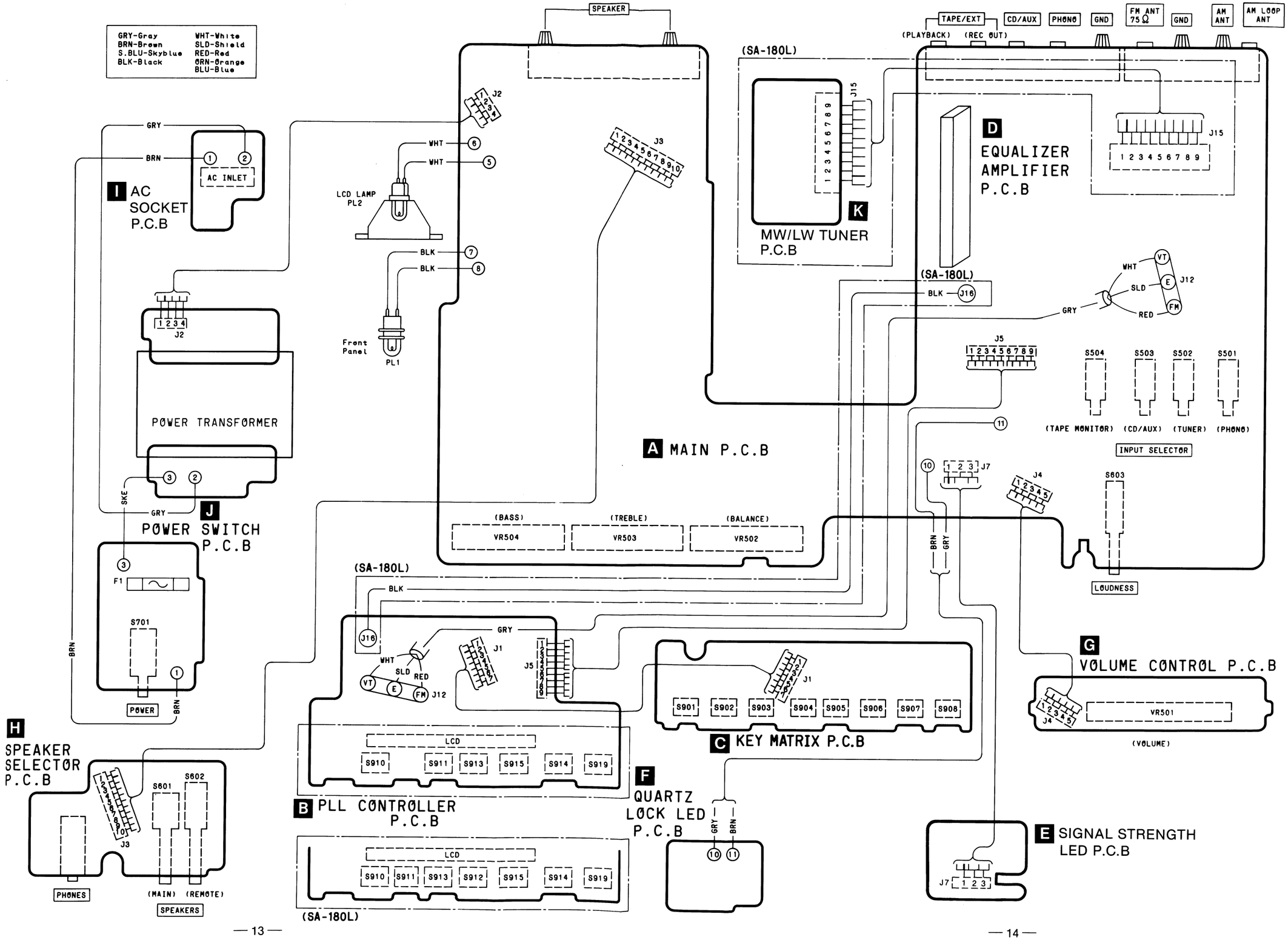
# ■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES





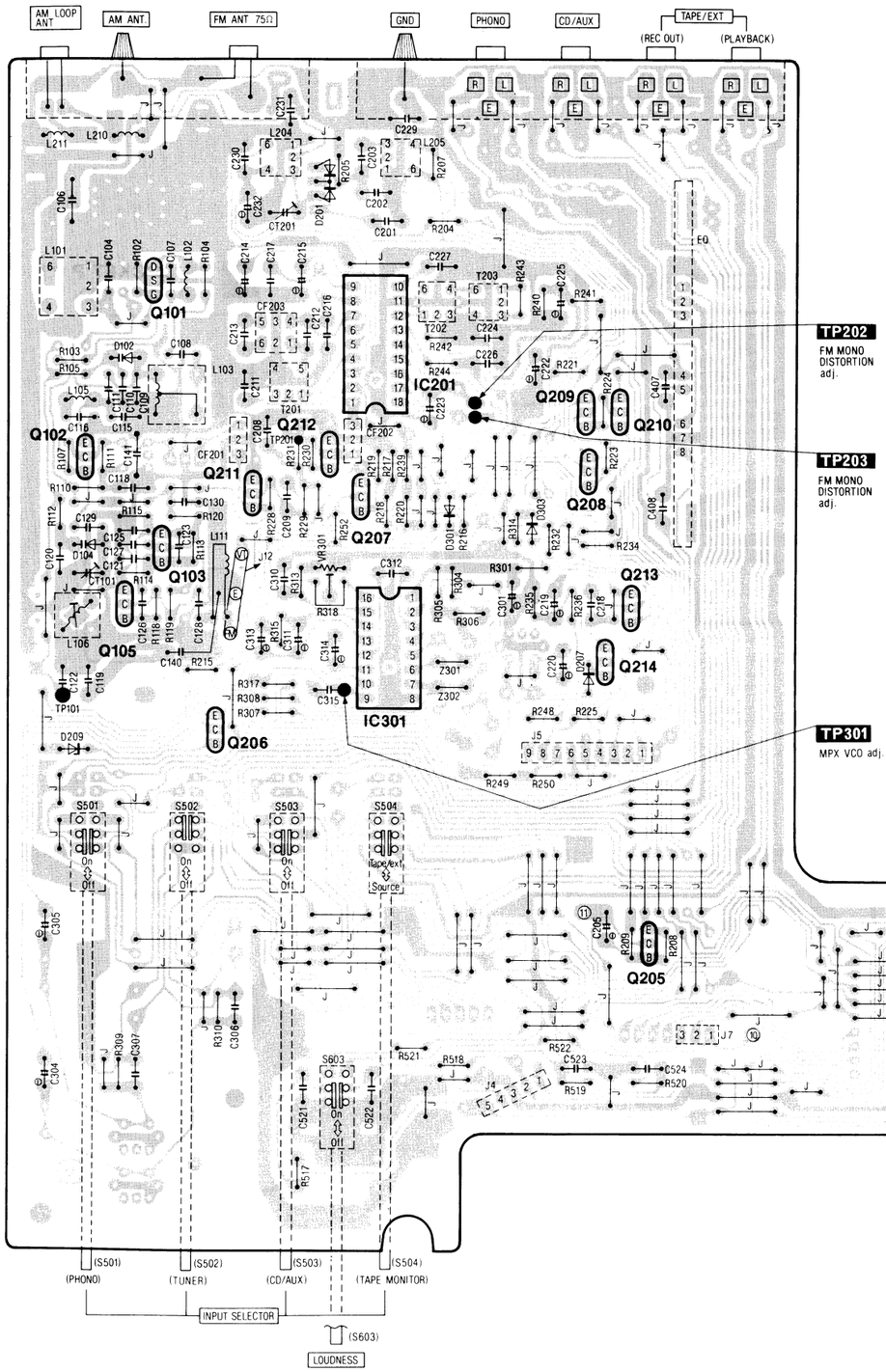

D

## ■ WIRING CONNECTION DIAGRAM

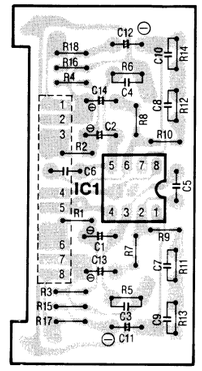


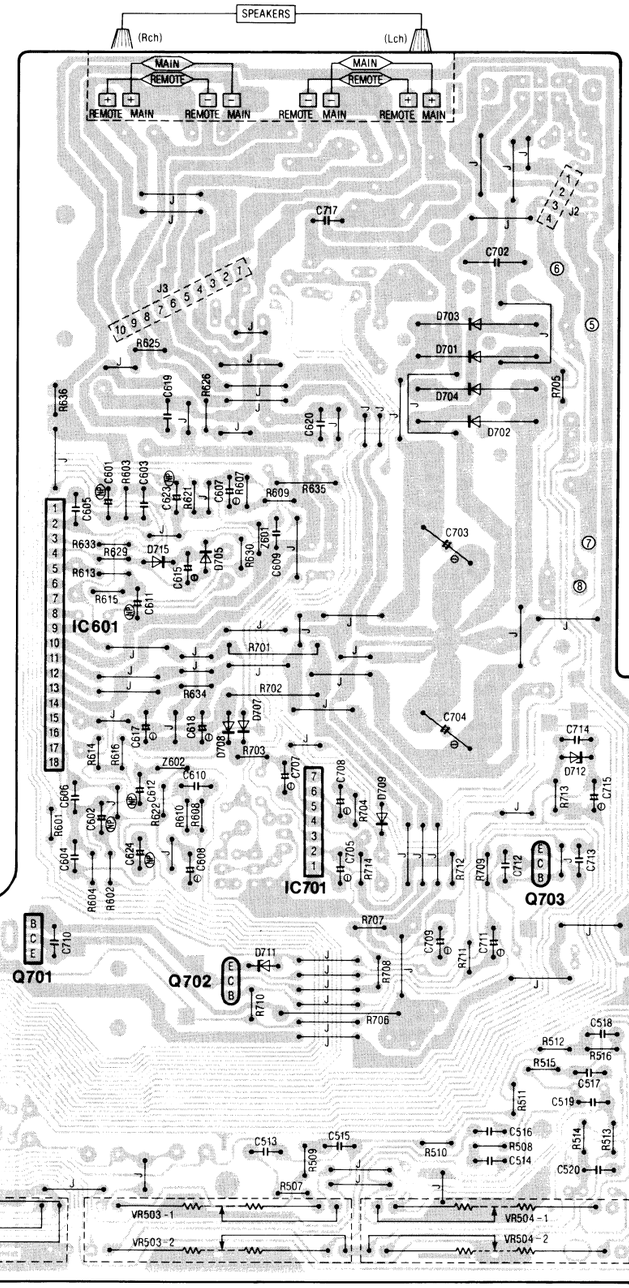
# ■ PRINTED CIRCUIT BOARDS

## A MAIN P.C.B. (SA-180)

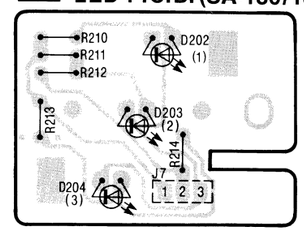



## D EQUALIZER AMPLIFIER P.C.B. (SA-180/180L)

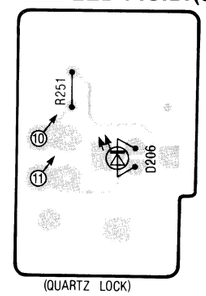



## E SIGNAL STRENGTH LED P.C.B. (SA-180/180L)




## F QUARTZ LOCK LED P.C.B. (SA-180/180L)




(QUARTZ LOCK)

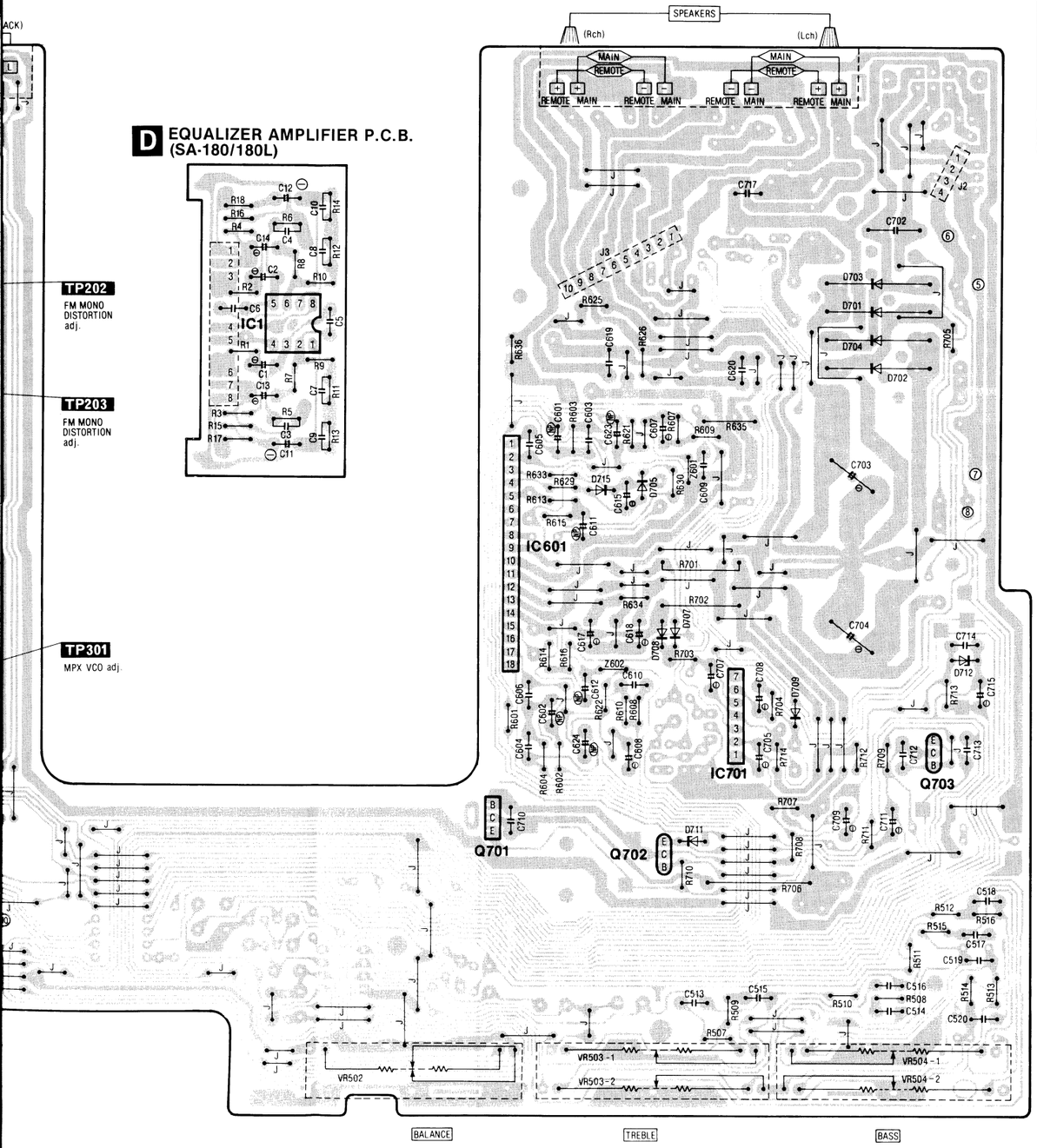
## D EQUALIZER AMPLIFIER P.C.B. (SA-180/180L)



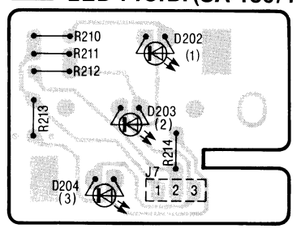

TP202
FM MONO DISTORTION adj.

TP203
FM MONO DISTORTION adj.

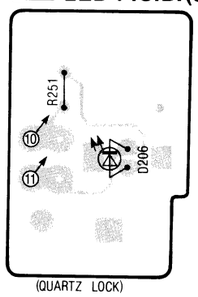
TP301
MPX VCO adj.




## E SIGNAL STRENGTH LED P.C.B. (SA-180/180L)

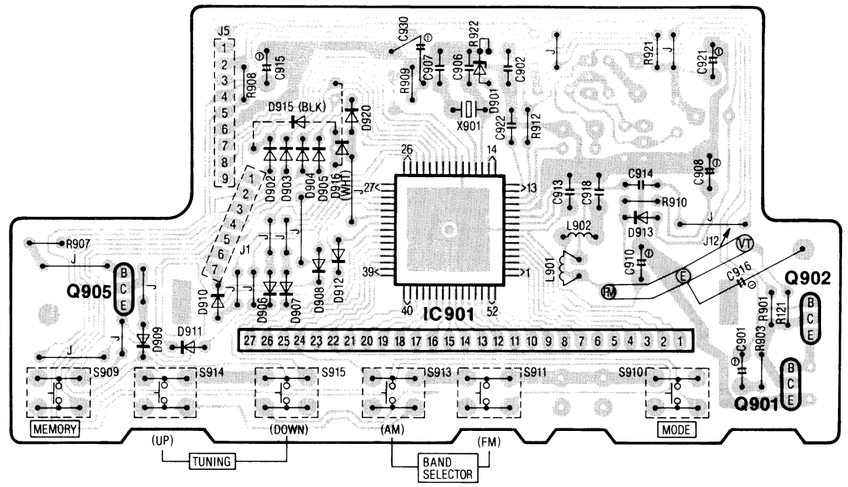



## F QUARTZ LOCK LED P.C.B. (SA-180 /180L)

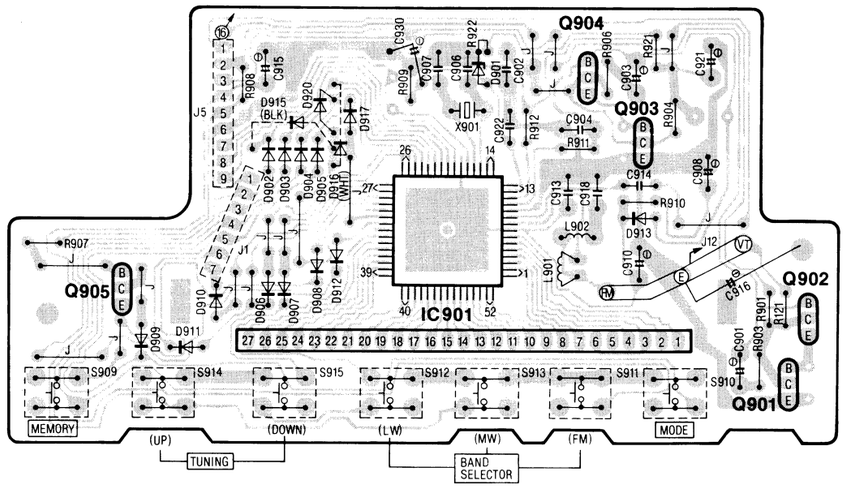



(QUARTZ LOCK)

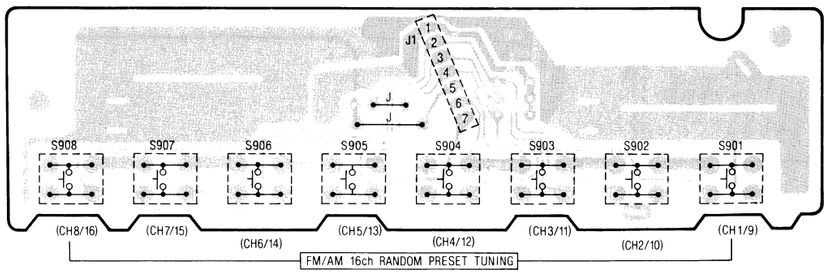
## B PLL CONTROLLER P.C.B. (SA-180)




## B PLL CONTROLLER P.C.B. (SA-180L)

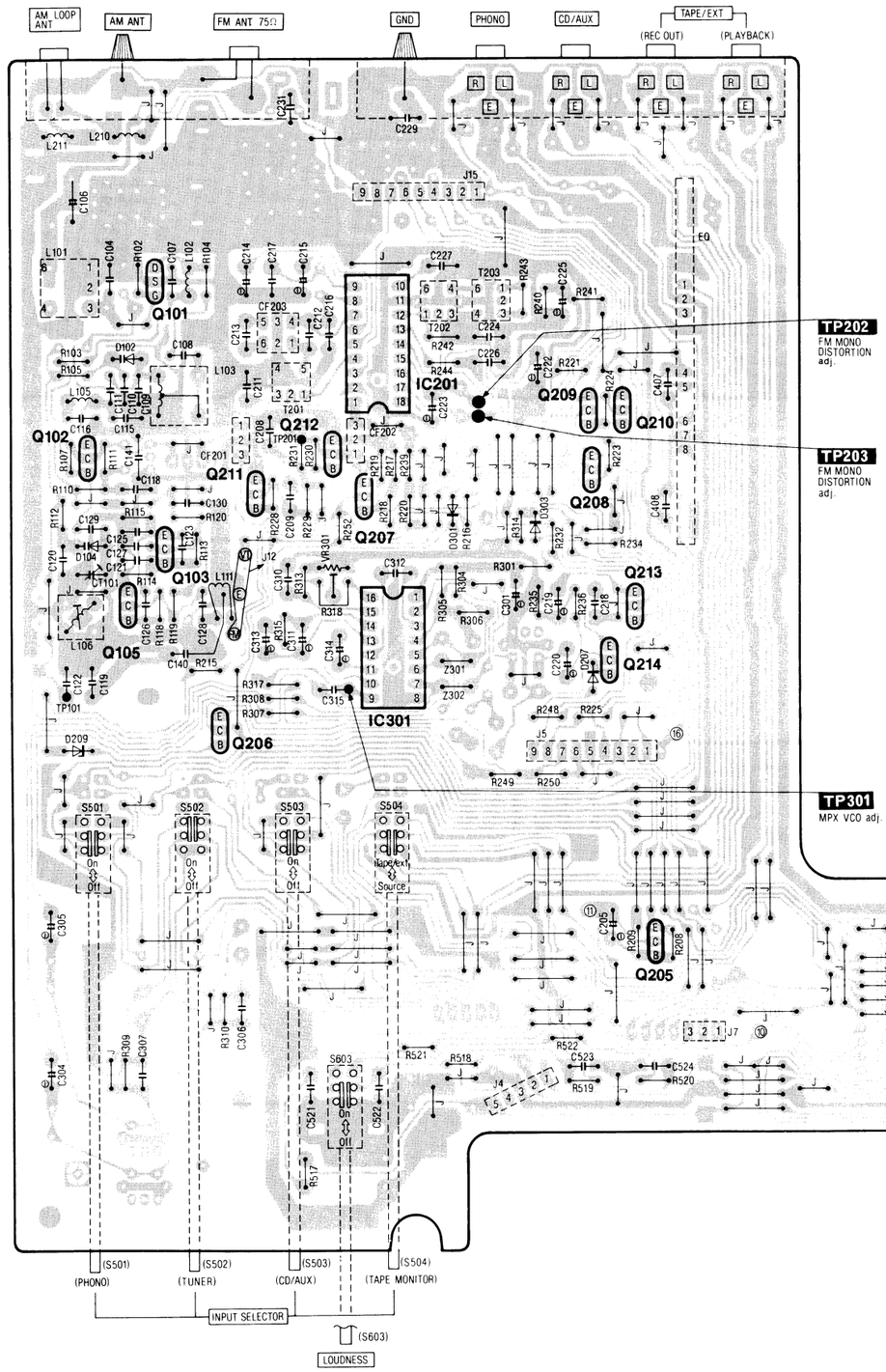



## C KEY-MATRIX P.C.B. (SA-180/180L)

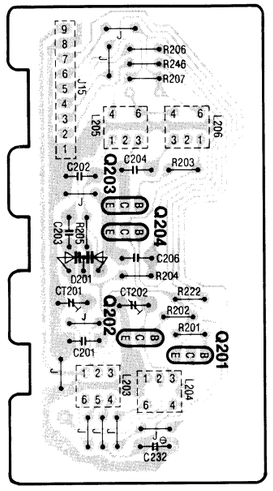


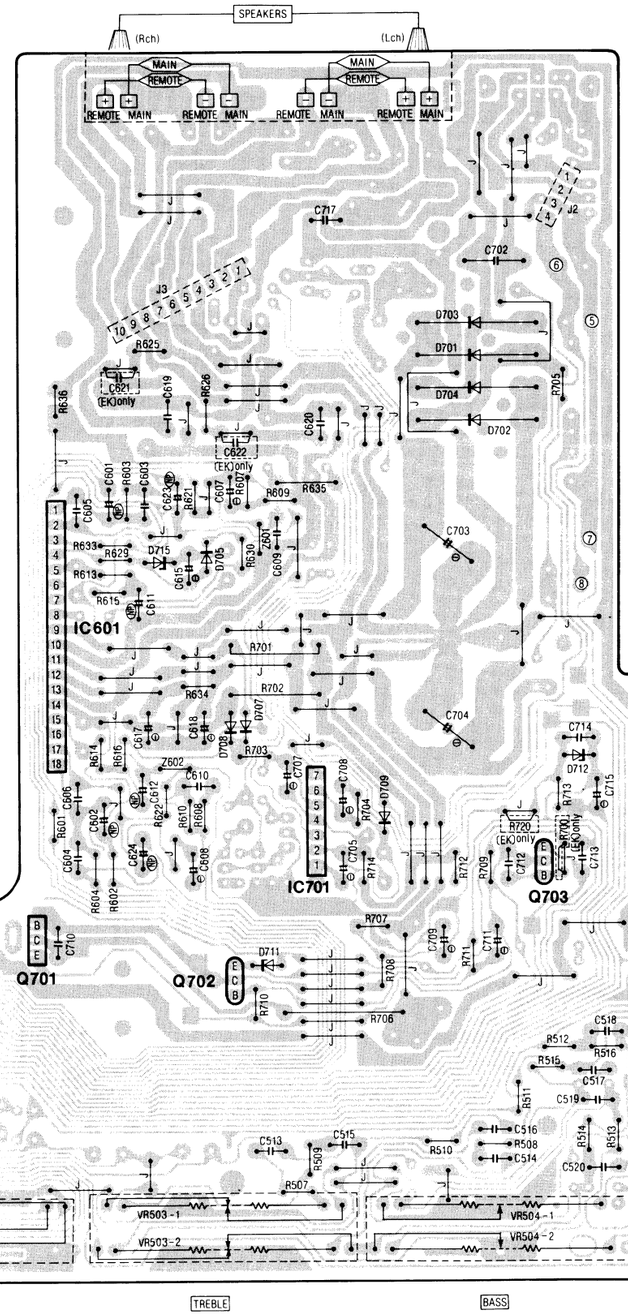
# ■ PRINTED CIRCUIT BOARDS

## A MAIN P.C.B. (SA-180L)



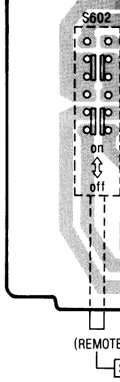

## K MW/LW TUNER P.C.B. (SA-180L)

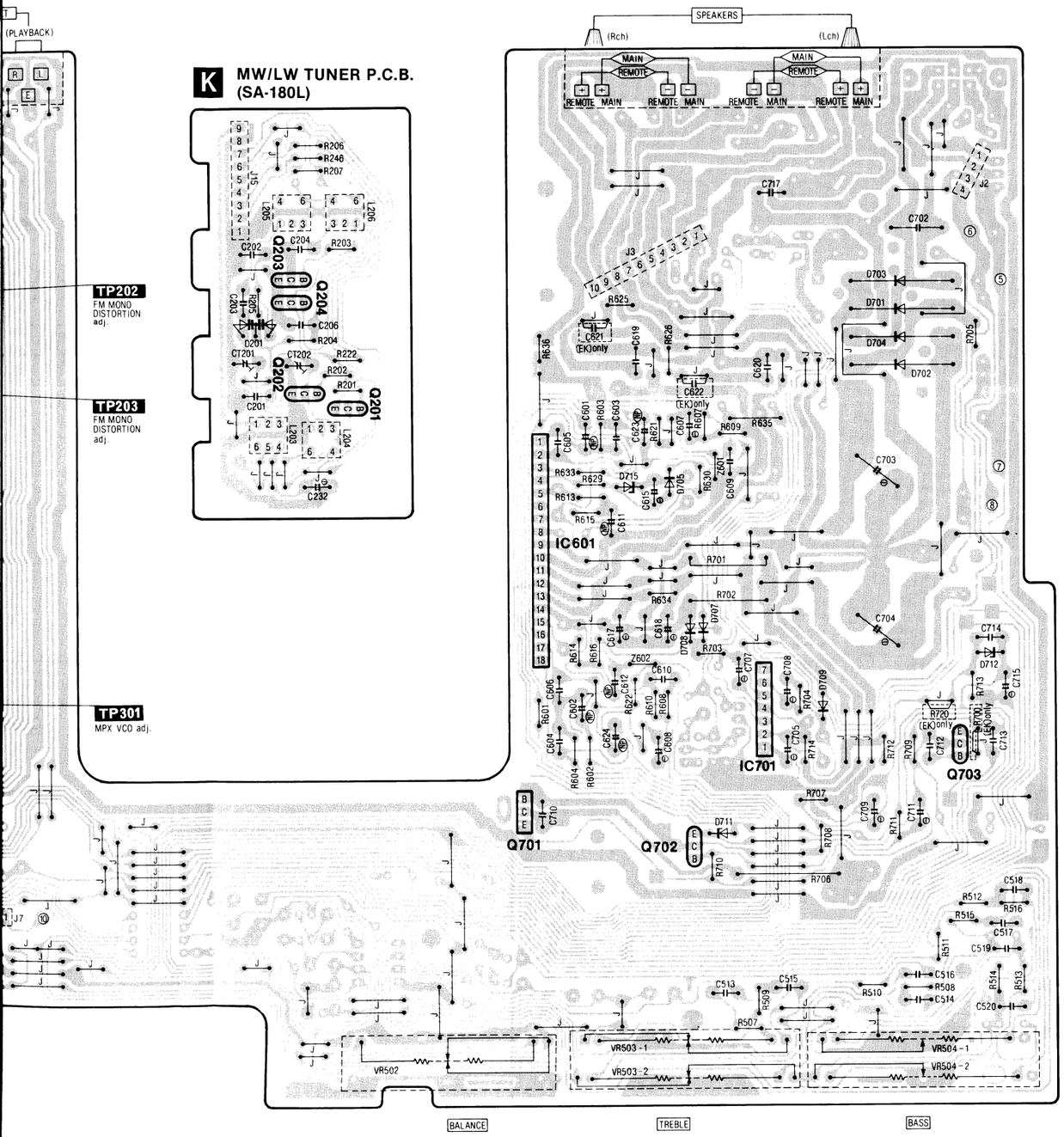



## G VOL

## H SPE

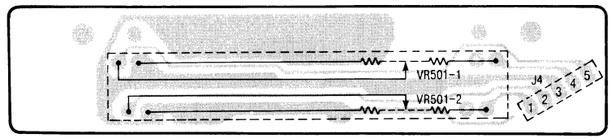




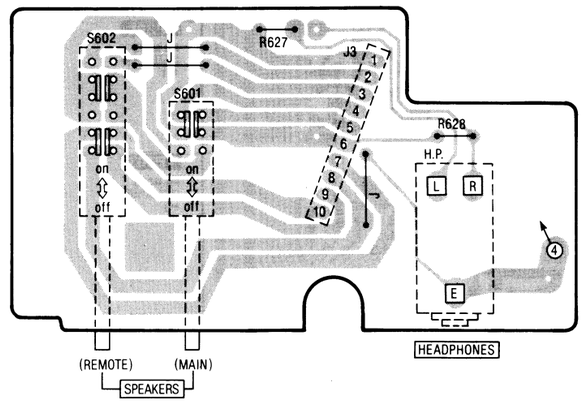

## K MW/LW TUNER P.C.B. (SA-180L)



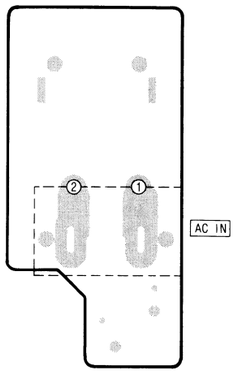

## G VOLUME CONTROL P.C.B. (SA-180/180L)



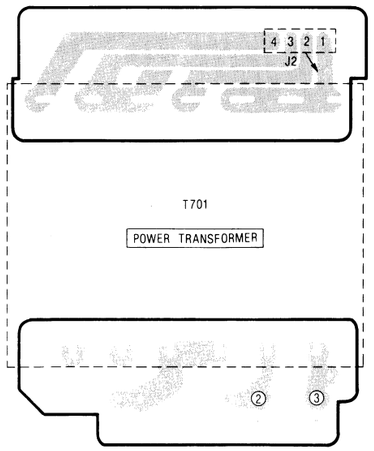

## H SPEAKER SELECTOR P.C.B. (SA-180/180L)



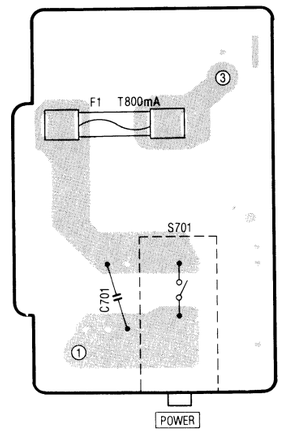

## I AC SOCKET P.C.B. (SA-180/180L)




(SA-180/180L)

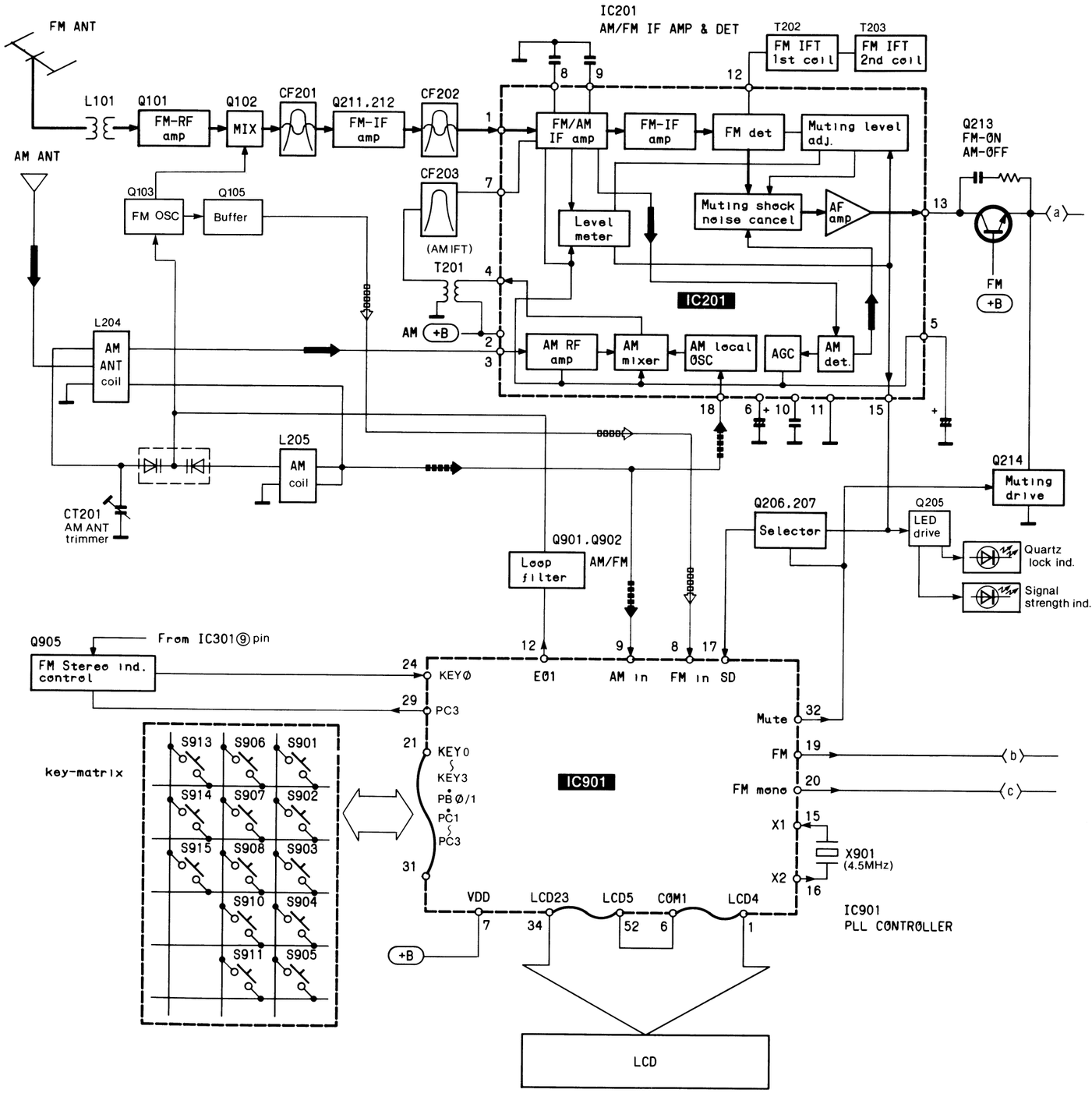



## J POWER SWITCH P.C.B. (SA-180/180L)

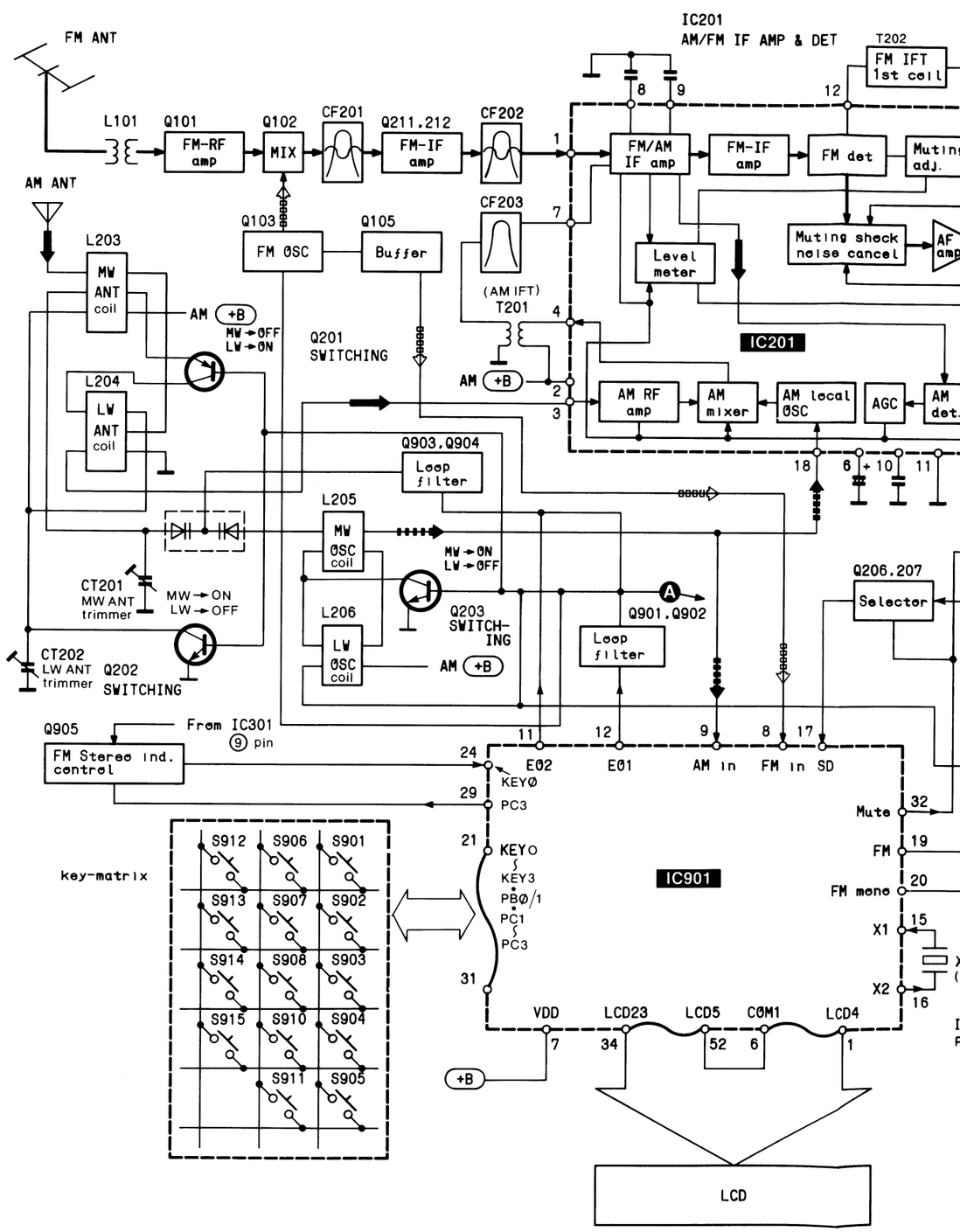


## ■ BLOCK DIAGRAM

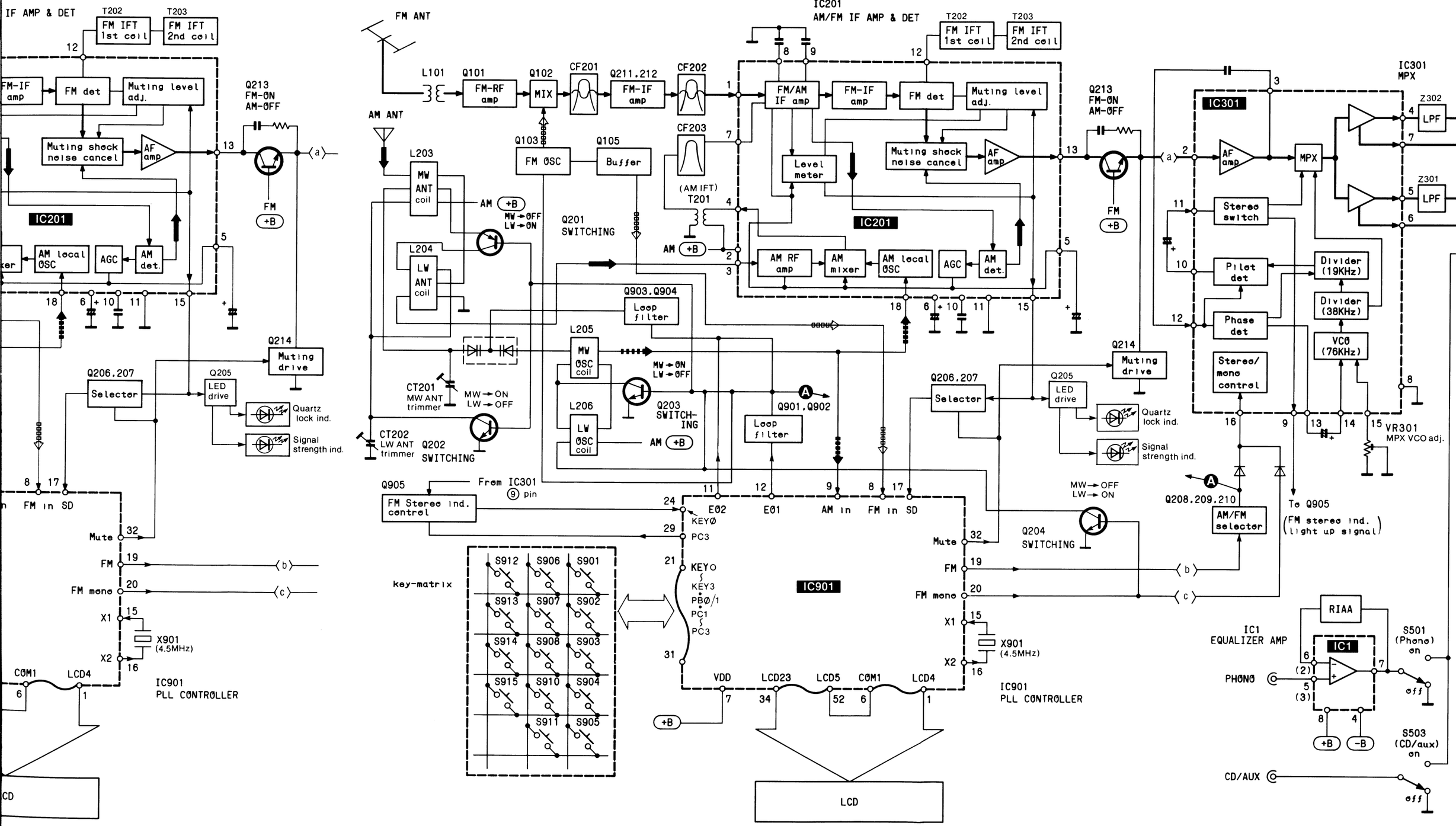
### (SA-180)




### (SA-180L)



## (SA-180L)


IF AMP & DET
T202
FM IFT 1st coil
T203
FM IFT 2nd coil
FM-IF amp
FM det
Muting level adj.
Muting shock noise cancel
AF amp
IC201
AM local OSC
AGC
AM det.
Q213
FM-ON AM-OFF
FM +B
Q214
Muting drive
Q206.207
Selector
Q205
LED drive
Quartz lock ind.
Signal strength ind.
FM IN SD
Mute
FM
FM mono
X1
X2
X901 (4.5MHz)
COM1
LCD4
IC901 PLL CONTROLLER
CD
FM ANT
AM ANT
L101
Q101
FM-RF amp
Q102
MIX
CF201
Q211.212
FM-IF amp
CF202
CF203
(AM IFT) T201
Q103
FM OSC
Q105
Buffer
Q201 SWITCHING
L203
MW ANT coil
AM +B
MW→OFF LW→ON
L204
LW ANT coil
CT201 MW ANT trimmer
MW→ON LW→OFF
CT202 LW ANT trimmer
Q202 SWITCHING
L205
MW OSC coil
L206
LW OSC coil
Q903.Q904
Loop filter
MW→ON LW→OFF
Q203 SWITCHING
AM +B
Q901.Q902
Loop filter
IC201
AM/FM IF AMP & DET
FM/AM IF amp
Level meter
AM RF amp
AM mixer
AM local OSC
AGC
AM det.
Muting shock noise cancel
AF amp
Q905
From IC301 (9) pin
FM Stereo ind. control
key-matrix
S912 S906 S901
S913 S907 S902
S914 S908 S903
S915 S910 S904
S911 S905
KEY0
KEY3
PB0/1
PC1
PC3
E02
E01
AM in
FM in SD
VDD
LCD23
LCD5
COM1
LCD4
IC901
LCD
IC301
MPX
Z302
Z301
LPF
De-emphasis
Stereo switch
Pilot det
Phase det
Divider (19KHz)
Divider (38KHz)
VCO (76KHz)
Stereo/ mono control
VR301
MPX VCO adj.
Q208.209.210
AM/FM selector
To Q905
(FM stereo ind. light up signal)
MW→OFF LW→ON
Q204 SWITCHING
IC1
EQUALIZER AMP
RIAA
PHONO
S501 (Phono) on
S503 (CD/aux) on
CD/AUX
off

IC201
AM/FM IF AMP & DET
T202
FM IFT
1st coil
T203
FM IFT
2nd coil
FM/AM
IF amp
FM-IF
amp
FM det
Muting level
adj.
Muting shock
noise cancel
AF
amp
Level
meter
IC201
AM RF
amp
AM
mixer
AM local
OSC
AGC
AM
det.
Q213
FM-ON
AM-OFF
FM
+B
IC301
MPX
IC301
AF
amp
MPX
Stereo
switch
Pilot
det
Phase
det
Stereo/
mono
control
Divider
(19KHz)
Divider
(38KHz)
VCO
(76KHz)
Z302
LPF
De-
emphasis
Z301
LPF
De-
emphasis
Rch
Tape/
ext
Rec out
Playback
tape
S502
(Tuner)
on
off
source
S504
(Tape monitor)
VR501
(Volume)
Loudness
on
off
S603
(Loudness)
VR502
(Balance)
Rch
IC601
2CH POWER AMP
IC601
Voltage
amp
Power
amp
Differential
Current
stabi.
Bias
control
Current
stabi.
Power
amp
Bass
Treble
Muting
+B
HEADPHONES
Rch
S601
(Main)
on
off
MAIN
S602
(Remote)
REMOTE
Q214
Muting
drive
Q206.207
Selector
Q205
LED
drive
Quartz
lock ind.
Signal
strength ind.
Q901.Q902
Loop
filter
MW→OFF
LW→ON
Q208.209.210
AM/FM
selector
To Q905
(FM stereo ind.
light up signal)
Q204
SWITCHING
E02
E01
AM in
FM in
SD
Mute
FM
FM mono
IC901
X1
X2
X901
(4.5MHz)
VDD
LCD23
LCD5
COM1
LCD4
IC901
PLL CONTROLLER
LCD
IC1
EQUALIZER AMP
RIAA
IC1
PHONO
S501
(Phono)
on
off
S503
(CD/aux)
on
CD/AUX
off
IC701
MUTING & PROTECTION
IC701
Power ON/OFF
det
Over load
det
Muting
Bias
D701 ~ 704
(Rectifier)
T701
AC IN
-B
+B
Q701 ~ 703
Regulator
PL2
PL1

Note)
- FM Sig
- FM OS
- AM Sig
- AM OS

# ■ REPLACEMENT PARTS LIST (SA-180L)

**Notes:** * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

* Ⓚ-marked parts are used for black only, while Ⓢ-marked parts are for silver type only.
* Part other than Ⓚ-and Ⓢ-marked are use for both black and silver type.
* Ⓜ mark stands for that the parts are supplied in MESA.

| Ref. No. | Part No. | Description |
|---|---|---|
| **INTEGRATED CIRCUITS** | | |
| IC1 | AN6558F | I.C.EQ AMP |
| IC201 | AN7273A | I.C.FM I.F DET |
| IC301 | AN7470 | I.C.FM MPX |
| IC601 ⚠ | SVIK4152-2M | I.C.2CH-POWER |
| IC701 ⚠ | AN7072N | I.C.MUTING |
| IC901 | UPD1718G514 | I.C.PLL CON. |
| **TRANSISTORS** | | |
| Q101 | 2SK241GR | TRANSISTOR, SI |
| Q102 | 2SC2786M | TRANSISTOR |
| Q103, Q105 | 2SC2787L | TRANSISTOR |
| Q201 | 2SA1175FE | TRANSISTOR |
| Q202, Q203 | 2SC2785F | TRANSISTOR |
| Q204 | 2SC2785F | TRANSISTOR |
| Q205 | 2SC1685-QNC | TRANSISTOR |
| Q206 | 2SA1175FE | TRANSISTOR |
| Q207 | 2SC2785F | TRANSISTOR |
| Q208, Q209 | 2SA1175FE | TRANSISTOR |
| Q210 | 2SC2785F | TRANSISTOR |
| Q211, Q212 | 2SC2787L | TRANSISTOR |
| Q213, Q214 | 2SC2785F | TRANSISTOR |
| Q701 | 2SD1265-0 | TRANSISTOR |
| Q702 | 2SC2785F | TRANSISTOR |
| Q703 | 2SC1384A-R | TRANSISTOR |
| Q901, Q902 | 2SC2785F | TRANSISTOR |
| Q903, Q904 | 2SC2785F | TRANSISTOR |
| Q905 | 2SA1175FE | TRANSISTOR |
| **DIODES** | | |
| D102, D104 | MA325G-Y | ZENER |
| D201 | KV1260Z | DIODE |
| D202, D203 | LN446YP | L.E.D |
| D204 | LN846RP | L.E.D |
| D206 | SLV31VC3 | L.E.D |
| D207 | MA165 | DIODE |
| D209 | MA4110M | DIODE |
| D301, D303 | MA165 | DIODE |
| D701, D702 ⚠ | SVDS2V20 | RECTIFIER |
| D703, D704 ⚠ | SVDS2V20 | RECTIFIER |
| D705, D707 | MA165 | DIODE |
| D708, D709 | MA165 | DIODE |
| D711 | MA4062-M | DIODE |
| D712 | MA4160M | DIODE, SI |
| D715 | MA4240H | DIODE |
| D901 | MA4110M | DIODE |
| D902, D903 | MA165 | DIODE |
| D904, D905 | MA165 | DIODE |
| D906, D907 | MA165 | DIODE |
| D908, D909 | MA165 | DIODE |
| D910, D911 | MA165 | DIODE |
| D912, D913 | MA165 | DIODE |
| D915, D916 | MA162A | DIODE |
| D917, D920 | MA165 | DIODE |
| **VARIABLE RESISTORS** | | |
| VR301 | QVNB3A00B472 | V.R.MPX VCO |
| VR501 | EWAPBAX05B15 | V.R.MAIN |
| VR502 | EWANF5X05G15 | V.R.BALANCE |
| VR503, VR504 | EWANA6X05C15 | V.R.TONE |
| **VARIABLE CAPACITORS** | | |
| CT101 | ECRHA007A41 | TRIMMER |
| CT201 | ECRHA010A41 | TRIMMER |
| CT202 | ECRHA020D41 | POLYETHYLENE CAPACITOR |
| **COILS AND TRANSFORMERS** | | |
| L101 | SLA4N39 | ANTENNA COIL |
| L102 | ELEPK1R2MA | COIL |
| L103 | SLD4P87 | COIL |
| L105 | ELEPK1R2MA | COIL |
| L106 | SL04N27-P | COIL |
| L111 | RLQY25S5 | CHOKE COIL |
| L203 | SLA2B3-P | ANTENNA COIL |
| L204 | SLA1B7R-P | ANTENNA COIL |
| L205 | SL02B9R-P | OSCILLATOR COIL |
| L206 | SL01B5-P | OSCILLATOR COIL |
| L210, L211 | ELEPK1R0MA | COIL |
| L901 | RLQY25S5 | CHOKE COIL |
| L902 | ELEPK1R2MA | COIL |
| T201 | SLI2B101-M | I.F.TRANSFORMER |
| T202 | SLI4B511-Z | I.F.TRANSFORMER |
| T203 | SLI4B513-Z | I.F.TRANSFORMER |
| T701 ⚠ (EW, EF, EB) | SLT5M466 | POWER TRANSFORMER |
| T701 ⚠ (EK) | SLT5M467 | POWER TRANSFORMER |
| **COMPONENT COMBINATIONS** | | |
| Z301, Z302 | EXRP181K473C | C-R COMBINATION |
| Z601, Z602 | EXPC150K153S | COMPONENT COM. Ⓜ |
| **FILTERS** | | |
| CF201 | SVFE107MS8A | CERAMIC FILTER (RED) |
| CF201 | SVFE107MS8D | CERAMIC FILTER (BLACK) |
| CF201 | SVFE107MS8E | CERAMIC FILTER (WHITE) |
| CF202 | SVFE107MS8A | CERAMIC FILTER (RED) |
| CF202 | SVFE107MS8D | CERAMIC FILTER (BLACK) |
| CF202 | SVFE107MS8E | CERAMIC FILTER (WHITE) |
| CF203 | SVFSFZ450F7L | CERAMIC FILTER |
| **OSCILLATORS** | | |
| X901 | SVQ49U452-T | OSCILLATOR |
| **DISPLAYS** | | |
| LCD1 | SALHLC9225-3 | LIQUID CRYSTAL DISPLAY |
| **LAMPS** | | |
| PL1 ⚠ | XAMR83S150A | PILOT LAMP |
| PL2 ⚠ | XAMR78S150 | PILOT LAMP |
| **FUSES** | | |
| F1 ⚠ (EK) | XBA2C08TB0 | FUSES 250V.T0.8A |
| F1 ⚠ (EW, EF, EB) | XBA2C08TR0 | FUSE |
| **SWITCHES** | | |
| S501, S502 | SSH497 | SWITCH, PH./TUNER |
| S503, S504 | SSH497 | SWITCH, CD/AUX/MO |
| S601, S602 | SSH2108-1 | SWITCH, SPEAKER |
| S603 | SSH1159 | SW, LOUDNESS |
| S701 ⚠ | SSH1071 | SWITCH, POWER |
| S901, S902 | SSG13 | SW |
| S903, S904 | SSG13 | SW |
| S905, S906 | SSG13 | SW |
| S907, S908 | SSG13 | SW |
| S909, S910 | SSG13 | SW |
| S911, S912 | SSG13 | SW |
| S913, S914 | SSG13 | SW |
| S915 | SSG13 | SW |

| Ref. No. | Part No. | Description |
|---|---|---|
| **CABINET AND CHASSIS** | | |
| 1 | SWV66 | L.E.D |
| 2 Ⓢ | SBDA2029-SM | KNOB |
| 2 Ⓚ | SBDA290-KM | KNOB |
| 3 Ⓚ | SGYA180L-KE | FRONT PANEL Ⓜ |
| 3 Ⓢ | SGYA180L-SE | FRONT PANEL Ⓜ |
| 4 Ⓢ | SBC571-T | BUTTON, SPEAKER |
| 4 Ⓚ | SBC571-10T | BUTTON, SPEAKER |
| 5 Ⓢ | SBC666 | BUTTON, POWER |
| 5 Ⓚ | SBC666-5 | BUTTON, POWER |
| 6 | SHG6380 | RUBBER SPACER |
| 7 | SGX7809 | ORNAMENT |
| 8 | SJT347 | FUSE HOLDER |
| 9 | SHR9789 | PLASTIC SPACER |
| 10 | SUX39 | BRACING STRUT |
| 11 | SUW2974 | BRACKET |
| 12 | SMC6395-1 | SHIELD COVER |
| 13 | SHR9771-2 | PLASTIC SPACER |
| 14 | SDU249-1 | GALSS, TRANSPARENT PLATE |
| 15 | SMP395-2 | ANGLE |
| 16 | SHR415 | LOCK PIN |
| 17 | SUB251 | ROD |
| 18 | SKUA180-KM | BOTTOM BOARD Ⓜ |
| 18-1 | SKL293 | RUBBER |
| 19 | SHE185-1 | SPACER |
| 20 Ⓢ | SBC315-4T | BUTTON, LOUDNESS |
| 20 Ⓚ | SBC315-7 | BUTTON, LOUDNESS |
| 21 Ⓚ | SHR5310 | PLASTIC SPACER |
| 21 Ⓢ | SHR5310-1 | PLASTIC SPACER |
| 22 Ⓚ | SKCA290-KG | CABINET |
| 22 Ⓢ | SKCA290-SG | CABINET BODY |
| 23 Ⓢ | SBD97 | KNOB, TONE |
| 23 Ⓚ | SBD97-3 | KNOB, TONE |
| 24 | SUW2928-2 | BRACKET |
| 25 | SUW2975 | BRACKET |
| 26 | SJF4818 | TERMINAL BOARD, SPEAKER |
| 27 | SJF3059-14N | TERMINAL BOARD, INPUT |
| 28 | SJF4441-4 | TERMINAL BOARD, ANTENNA |
| 29 (EF) | SGPA180L-KF | REAR PANEL Ⓜ |
| 29 (EK) | SGP6703C | REAR PANEL Ⓜ |
| 29 (EW, EB) | SGP6703D | REAR PANEL Ⓜ |
| 30 | SJS9231B | AC INLET |
| 31 | SJS9231A | AC, INLET COVER |
| 34 | SHR9748 | PLASTIC SPACER |
| 35 | SJJ126B | JACK |
| 37 Ⓚ | SBCA180-KE1 | BUTTON, PHONO Ⓜ |
| 37 Ⓢ | SBCA180-SE1 | BUTTON, PHONO Ⓜ |
| 38 Ⓚ | SBCA180-KE2 | BUTTON, TUNER Ⓜ |
| 38 Ⓢ | SBCA180-SE2 | BUTTON, TUNER Ⓜ |
| 39 Ⓚ | SBCA180-KE3 | BUTTON, CD Ⓜ |
| 39 Ⓢ | SBCA180-SE3 | BUTTON, CD Ⓜ |
| 40 Ⓚ | SBCA180-KE4 | BUTTON Ⓜ |
| 40 Ⓢ | SBCA180-SE4 | BUTTON Ⓜ |
| 41 | SJT30340LX-V | CONNECTOR(3-P) |
| 42 Ⓢ | SHR9764-4 | PLASTIC SPACER |
| 42 Ⓚ | SHR9764-5 | PLASTIC SPACER |
| 45 | SUW2013-1 | BRACKET |
| 46 | SHR301 | CLAMPER |
| **SCREWS, WASHERS AND NUTS** | | |
| N1 | XTB3+8G | SCREW |
| N2 | XTBS3+8JFZ1 | SCREW |
| N3 | XTW3+8T | SCREW |
| N4 | XTBS3+16F1 | SCREW |
| N5 Ⓢ | SNE2129-2 | ORNAMENT SCREW |
| N5 Ⓚ | SNE2129-3 | ORNAMENT SCREW |
| N6 | SNE2117-1 | SCREW |
| N7 | SNE2118 | SCREW |
| N8 | XTBS3+8FFZ1 | TAPPING SCREW |

| Ref. No. | Part No. | Description |
|---|---|---|
| **PACKINGS** | | |
| P1 (EK) | SPG6103 | CARTON BOX Ⓜ |
| P1 (EW, EB) | SPG6104 | CARTON BOX Ⓜ |
| P1 (EF) | SPG6105 | CARTON BOX Ⓜ |
| P2 | SPS4433-3 | PAD |
| P3 | SPS4432-3 | PAD |
| P5 | SPS4693 | PAD |
| P6 | SPP719 | PROTECTION COVER |
| **ACCESSORIES** | | |
| A1 ⚠ (EB) | SFDAC05E02 | POWER CORD |
| A1 ⚠ (EW, EF) | SFDAC05E03 | POWER CORD |
| A1 ⚠ (EK) | SFDAC05G02 | POWER CORD |
| A2 | SSA270M | FM ANTENNA |
| A3 | SSA902-5 | ANTENNA |
| A4 | SMA231 | HOLDER (FOR SET) |
| A5 | SMA233-1 | ANTENNA HOLDER (FOR RACK) |
| A6 | XTN3+10AFZ | SCREW |
| A7 | SQF13060 | INSTRUCTION BOOK Ⓜ |
| A9 | SJP9009 | PLUG |





# ■ SCHEMA

(This schematic diag
development of new

**Note 1:**

- **S501～S503** : Input
  [ S50
  L S50
- **S504** : Tape r
  (▬ tap
- **S601** : Main s
  (▬ on,
- **S602** : Remot
  (▬ on,
- **S603** : Loudn
  (▬ on,
- **S701** : Power
  (▬ on,
- **S901～S908** : Preset
  [ S90
  S90
  S90
  L S90
- **S909** : Memor
  (manua
- **S910** : FM mo
  (auto –
- **S911～S913** : Band
  (S911 –
  S913 –
- **S914, S915** : Tuning
  (S914 –
- ⟹ FM signal li
  □□□□ FM OSC
  ■■■■ AM (MW), L
- Important safety not
  Components identifie
  important for safety.
  use only manufactur
- Indicated voltage val
  by the DC electronic
  taken as standard.
  voltage values, deper
  tester.
- * All voltage values sh
  (stereo signal) recep
- * Figures in ( ) sta
- * Figures in ⌜ ⌟ sta
- * Figures in ▭ stan

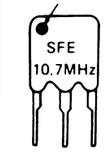
| Part No. | Origi |
|---|---|
| D915, D916 | MA15 |

**Note 2:**

- **Use of ceramic fi**

The ceramic filters (C
are available in two r
ceramics of the same r
At repairing and rep
(D915, D916) for us
on each rank of the ce

Color marking




| R (C |
|---|
| F |
| W |
| B |

| Ref. No. | | Part No. | Description | |
|---|---|---|---|---|
| **CABINET AND CHASSIS** | | | | |
| 1 | | SWV66 | L.E.D | |
| 2 | Ⓢ | SBDA2029-SM | KNOB | |
| 2 | Ⓚ | SBDA290-KM | KNOB | |
| 3 | Ⓚ | SGYA180L-KE | FRONT PANEL | Ⓜ |
| 3 | Ⓢ | SGYA180L-SE | FRONT PANEL | Ⓜ |
| 4 | Ⓢ | SBC571-T | BUTTON, SPEAKER | |
| 4 | Ⓚ | SBC571-10T | BUTTON, SPEAKER | |
| 5 | Ⓢ | SBC666 | BUTTON, POWER | |
| 5 | Ⓚ | SBC666-5 | BUTTON, POWER | |
| 6 | | SHG6380 | RUBBER SPACER | |
| 7 | | SGX7809 | ORNAMENT | |
| 8 | | SJT347 | FUSE HOLDER | |
| 9 | | SHR9789 | PLASTIC SPACER | |
| 10 | | SUX39 | BRACING STRUT | |
| 11 | | SUW2974 | BRACKET | |
| 12 | | SMC6395-1 | SHIELD COVER | |
| 13 | | SHR9771-2 | PLASTIC SPACER | |
| 14 | | SDU249-1 | GALSS,TRANSPARENT PLATE | |
| 15 | | SMP395-2 | ANGLE | |
| 16 | | SHR415 | LOCK PIN | |
| 17 | | SUB251 | ROD | |
| 18 | | SKUA180-KM | BOTTOM BOARD | Ⓜ |
| 18-1 | | SKL293 | RUBBER | |
| 19 | | SHE185-1 | SPACER | |
| 20 | Ⓢ | SBC315-4T | BUTTON, LOUDNESS | |
| 20 | Ⓚ | SBC315-7 | BUTTON, LOUDNESS | |
| 21 | Ⓚ | SHR5310 | PLASTIC SPACER | |
| 21 | Ⓢ | SHR5310-1 | PLASTIC SPACER | |
| 22 | Ⓚ | SKCA290-KG | CABINET | |
| 22 | Ⓢ | SKCA290-SG | CABINET BODY | |
| 23 | Ⓢ | SBD97 | KNOB, TONE | |
| 23 | Ⓚ | SBD97-3 | KNOB, TONE | |
| 24 | | SUW2928-2 | BRACKET | |
| 25 | | SUW2975 | BRACKET | |
| 26 | | SJF4818 | TERMINAL BOARD, SPEAKER | |
| 27 | | SJF3059-14N | TERMINAL BOARD, INPUT | |
| 28 | | SJF4441-4 | TERMINAL BOARD, ANTENNA | |
| 29 (EF) | | SGPA180L-KF | REAR PANEL | Ⓜ |
| 29 (EK) | | SGP6703C | REAR PANEL | Ⓜ |
| 29 (EW, EB) | | SGP6703D | REAR PANEL | Ⓜ |
| 30 | | SJS9231B | AC INLET | |
| 31 | | SJS9231A | AC.INLET COVER | |
| 34 | | SHR9748 | PLASTIC SPACER | |
| 35 | | SJJ126B | JACK | |
| 37 | Ⓚ | SBCA180-KE1 | BUTTON, PHONO | Ⓜ |
| 37 | Ⓢ | SBCA180-SE1 | BUTTON, PHONO | Ⓜ |
| 38 | Ⓚ | SBCA180-KE2 | BUTTON, TUNER | Ⓜ |
| 38 | Ⓢ | SBCA180-SE2 | BUTTON, TUNER | Ⓜ |
| 39 | Ⓚ | SBCA180-KE3 | BUTTON, CD | Ⓜ |
| 39 | Ⓢ | SBCA180-SE3 | BUTTON, CD | Ⓜ |
| 40 | Ⓚ | SBCA180-KE4 | BUTTON | Ⓜ |
| 40 | Ⓢ | SBCA180-SE4 | BUTTON | Ⓜ |
| 41 | | SJT30340LX-V | CONNECTOR(3-P) | |
| 42 | Ⓢ | SHR9764-4 | PLASTIC SPACER | |
| 42 | Ⓚ | SHR9764-5 | PLASTIC SPACER | |
| 45 | | SUW2013-1 | BRACKET | |
| 46 | | SHR301 | CLAMPER | |
| **SCREWS,WASHERS AND NUTS** | | | | |
| N1 | | XTB3+8G | SCREW | |
| N2 | | XTBS3+8JFZ1 | SCREW | |
| N3 | | XTW3+8T | SCREW | |
| N4 | | XTBS3+16F1 | SCREW | |
| N5 | Ⓢ | SNE2129-2 | ORNAMENT SCREW | |
| N5 | Ⓚ | SNE2129-3 | ORNAMENT SCREW | |
| N6 | | SNE2117-1 | SCREW | |
| N7 | | SNE2118 | SCREW | |
| N8 | | XTBS3+8FFZ1 | TAPPING SCREW | |

| Ref. No. | | Part No. | Description | |
|---|---|---|---|---|
| **PACKINGS** | | | | |
| P1 (EK) | | SPG6103 | CARTON BOX | Ⓜ |
| P1 (EW, EB) | | SPG6104 | CARTON BOX | Ⓜ |
| P1 (EF) | | SPG6105 | CARTON BOX | Ⓜ |
| P2 | | SPS4433-3 | PAD | |
| P3 | | SPS4432-3 | PAD | |
| P5 | | SPS4693 | PAD | |
| P6 | | SPP719 | PROTECTION COVER | |
| **ACCESSORIES** | | | | |
| A1 | ⚠ | SFDAC05E02 | POWER CORD | |
| (EB) A1 | ⚠ | SFDAC05E03 | POWER CORD | |
| (EW, EF) A1 | ⚠ | SFDAC05G02 | POWER CORD | |
| (EK) A2 | | SSA270M | FM ANTENNA | |
| A3 | | SSA902-5 | ANTENNA | |
| A4 | | SMA231 | HOLDER (FOR SET) | |
| A5 | | SMA233-1 | ANTENNA HOLDER (FOR RACK) | |
| A6 | | XTN3+10AFZ | SCREW | |
| A7 | | SQF13060 | INSTRUCTION BOOK | Ⓜ |
| A9 (EK) | | SJP9009 | PLUG | |



# ■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

**Note 1:**

- **S501**~**S503** : Input selector switch in "**tuner**" position.
  [ S501 — phono  S502 — tuner
  S503 — CD/aux ]
- **S504** : Tape monitor selector switch in "**source**" position.
  (▂ tape/ext, ▇ source)
- **S601** : Main speaker switch in "**on**" position.
  (▂ on, ▇ off)
- **S602** : Remote speaker switch in "**off**" position.
  (▂ on, ▇ off)
- **S603** : Loudness switch in "**off**" position.
  (▂ on, ▇ off)
- **S701** : Power switch in "**on**" position.
  (▂ on, ▇ off)
- **S901**~**S908** : Preset tuning switch.
  [ S901 — CH1/CH9  S902 — CH2/CH10
  S903 — CH3/CH11  S904 — CH4/CH12
  S905 — CH5/CH13  S906 — CH6/CH14
  S907 — CH7/CH15  S908 — CH8/CH16 ]
- **S909** : Memory switch in "**manual**" position.
  (manual — auto)
- **S910** : FM mode selector switch in "**mono**" position.
  (auto — mono)
- **S911**~**S913** : Band mode selector switch in "**FM**" position.
  (S911 — FM, S912 — LW **(SA-180L only)**
  S913 — MW)
- **S914, S915** : Tuning switch.
  (S914 — up, S915 — down)

- ⇨ FM signal line  ➡ AM (MW), LW signal line
  ⇨ FM OSC  ▒ AF signal line
  ➡ AM (MW), LW OSC  ⊏⊐ Positive and negative voltage line
- Important safety notice:
  Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

* All voltage values shown in circuitry are DC voltage in FM signal (stereo signal) reception mode.
* Figures in ( ) stand for DC voltage in AM signal reception mode.
* Figures in ⌜ ⌟ stand for DC voltage in LW signal reception mode.
* Figures in ▭ stand for DC voltage in muting mode.

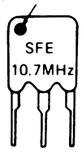
| Part No. | Original Part No. | Supplyment Part No. |
|---|---|---|
| D915, D916 | MA150 | MA162A |

**Note 2:**

- **Use of ceramic filters in pairs**

The ceramic filters (CF201, CF202 and CF203) for FM-IF circuit are available in two ranks. For this machine, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diode (D915, D916) for use as different diodes must be used depending on each rank of the ceramic filters.

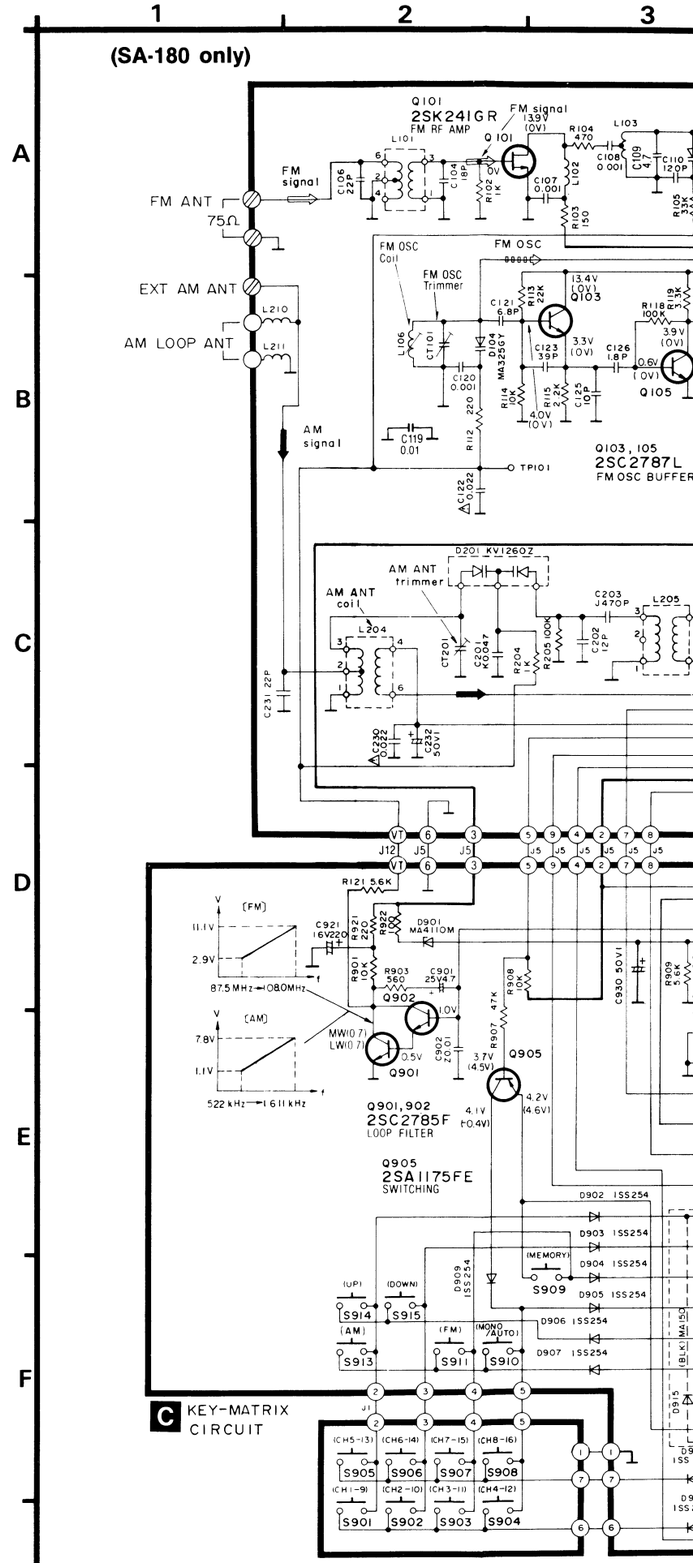
Color marking




| RANK (Color) | D915 | D916 | CENTER FREQUENCY |
|---|---|---|---|
| Red | X | X | 10.70 MHz |
| White | X | ○ | 10.75 MHz |
| Black | ○ | X | 10.65 MHz |

**Note:** ○ Mark Diode is used.
X Mark Diode is not used.





| Description | |
|---|---|
| TERMINAL BOARD, INPUT | |
| TERMINAL BOARD, ANTENNA | |
| REAR PANEL | M |
| REAR PANEL | M |
| REAR PANEL | M |
| AC INLET | |
| AC INLET COVER | |
| PLASTIC SPACER | |
| JACK | |
| BUTTON, PHONO | M |
| BUTTON, PHONO | M |
| BUTTON, TUNER | M |
| BUTTON, TUNER | M |
| BUTTON, CD | M |
| BUTTON, CD | M |
| BUTTON | M |
| BUTTON | M |
| CONNECTOR(3-P) | |
| PLASTIC SPACER | |
| PLASTIC SPACER | |
| BRACKET | |
| CLAMPER | |
| SCREW | |
| SCREW | |
| SCREW | |
| SCREW | |
| ORNAMENT SCREW | |
| ORNAMENT SCREW | |
| SCREW | |
| SCREW | |
| TAPPING SCREW | |

| Description | |
|---|---|
| POWER CORD | |
| POWER CORD | |
| FM ANTENNA | |
| ANTENNA | |
| HOLDER (FOR SET) | |
| ANTENNA HOLDER (FOR RACK) | |
| SCREW | |
| INSTRUCTION BOOK | M |
| PLUG | |

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  S903 — CH3/CH11  S904 — CH4/CH12
  S905 — CH5/CH13  S906 — CH6/CH14
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- **S911**~**S913** : Band mode selector switch in "**FM**" position.
  (S911 — FM, S912 — LW **(SA-180L only)**
  S913 — MW)
- **S914, S915** : Tuning switch.
  (S914 — up, S915 — down)
- ⇨ FM signal line  ➡ AM (MW), LW signal line
  ⇨ FM OSC  ▒ AF signal line
  ➡ AM (MW), LW OSC  —▭— Positive and negative voltage line
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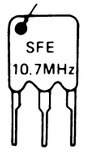
| Part No. | Original Part No. | Supplyment Part No. |
|---|---|---|
| D915, D916 | MA150 | MA162A |

**Note 2:**

### • Use of ceramic filters in pairs

The ceramic filters (CF201, CF202 and CF203) for FM-IF circuit are available in two ranks. For this machine, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diode (D915, D916) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking

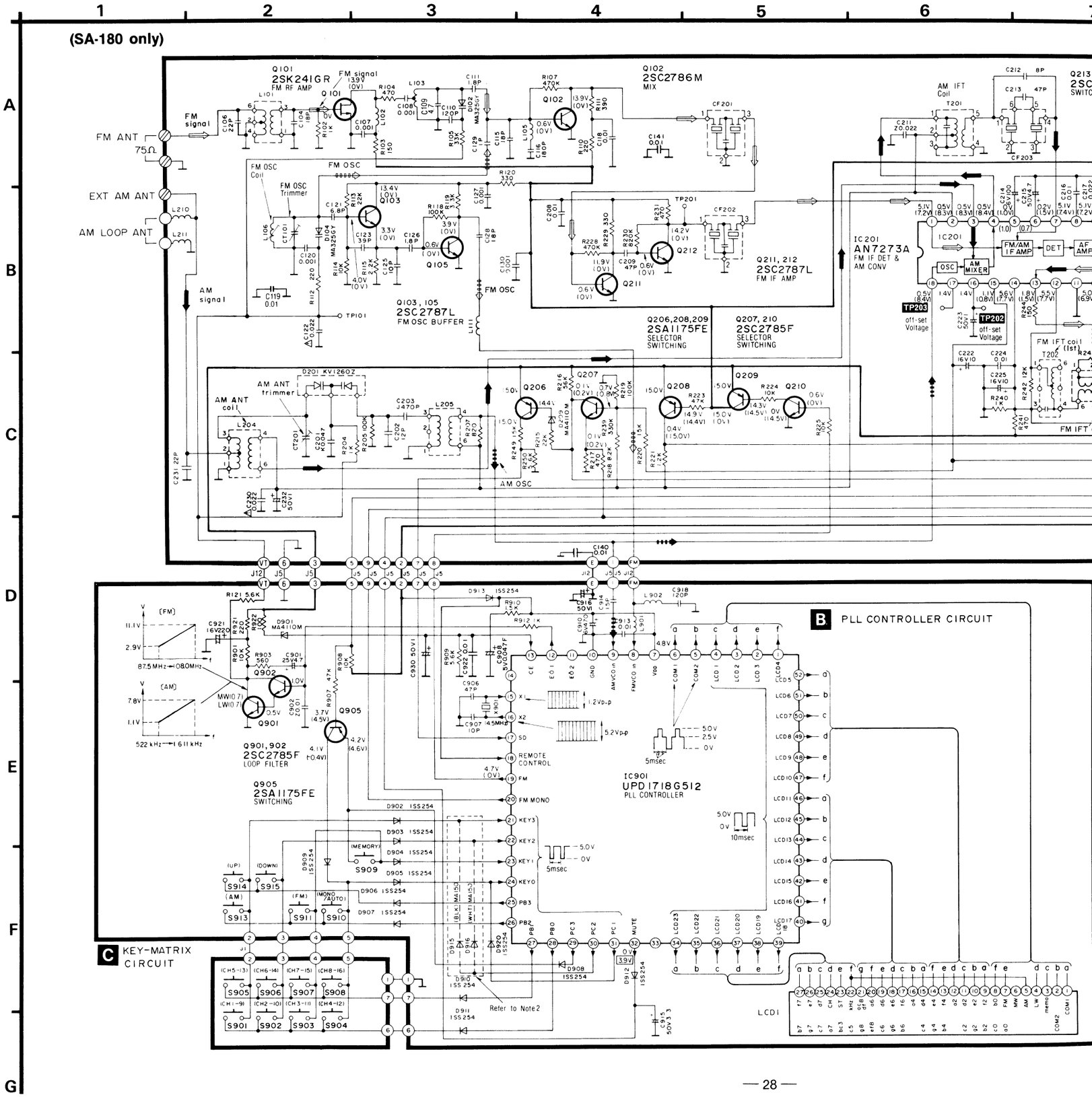


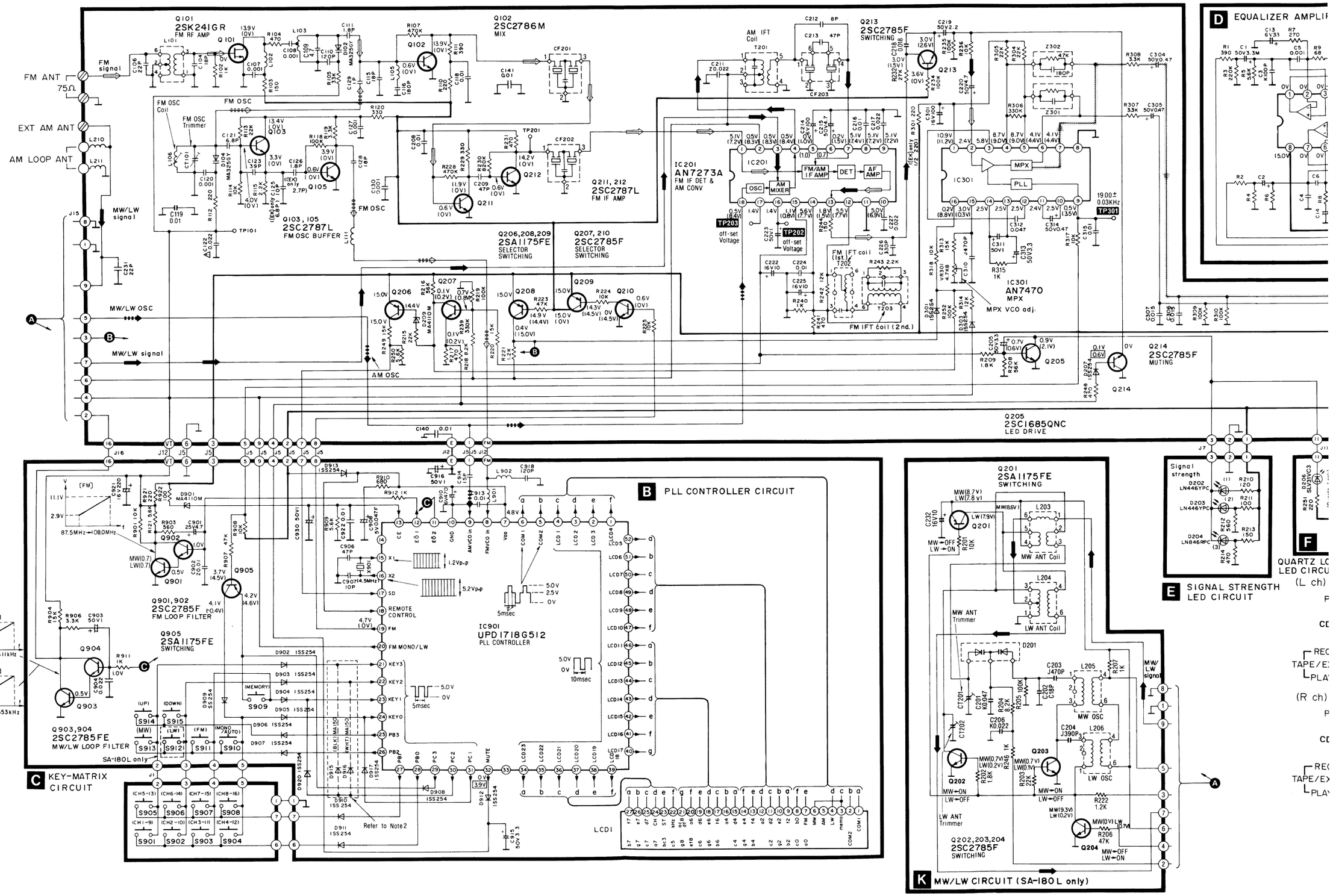

| RANK (Color) | D915 | D916 | CENTER FREQUENCY |
|---|---|---|---|
| Red | X | X | 10.70 MHz |
| White | X | ○ | 10.75 MHz |
| Black | ○ | X | 10.65 MHz |

**Note:** ○ Mark Diode is used.
X Mark Diode is not used.



**(SA-180 only)**







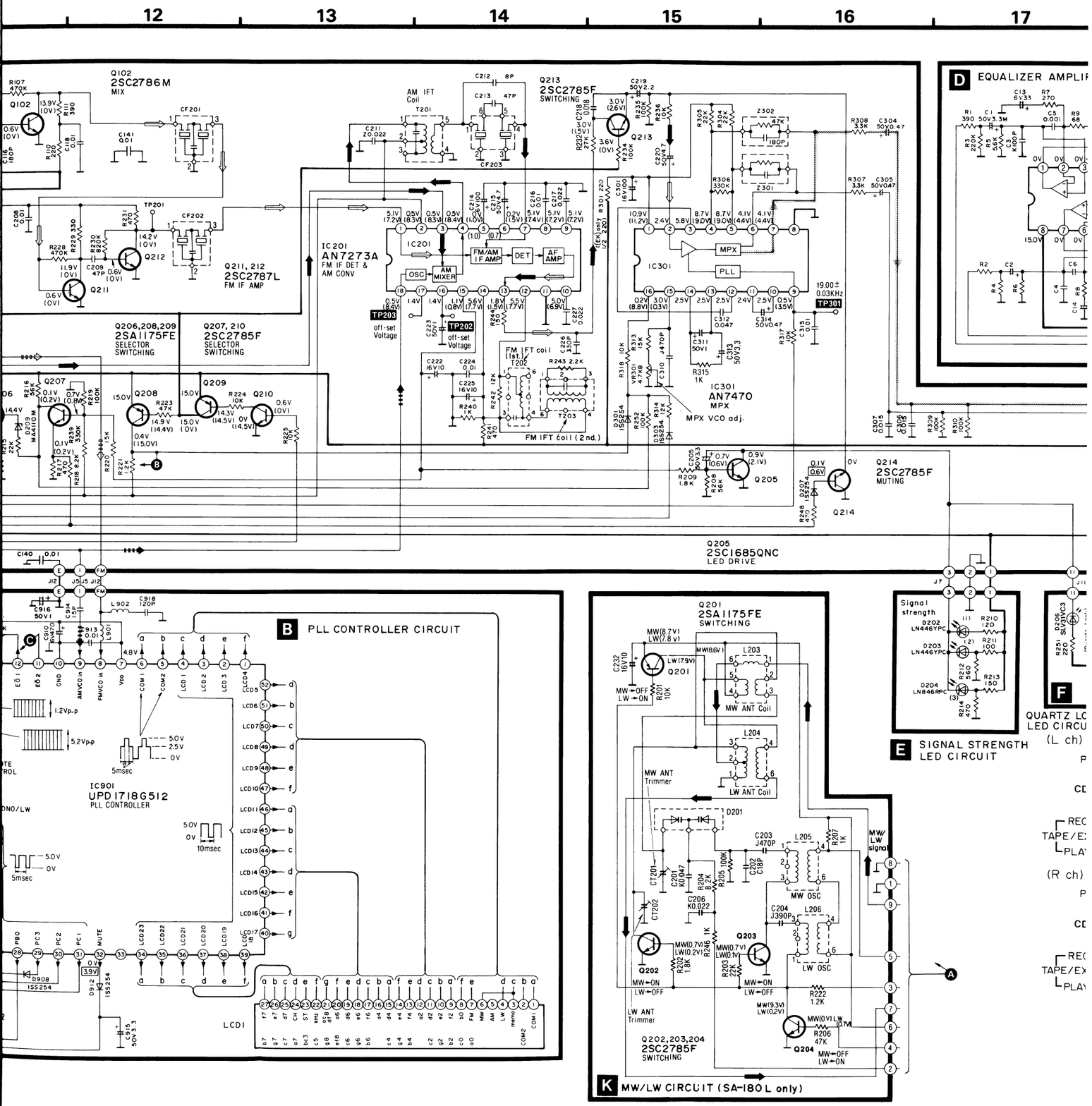



## RE

Notes: *

• Char

| Ref. | |
|---|---|
| RESIS | |
| R201 | |
| R202 | |
| R203 | |
| R204 | |
| R206 | |
| R207 | |
| R222 | |
| R246 | |
| R634 | |
| R700 | |
| R712 | |
| R720 | |
| R904 | |
| R906 | |
| R911 | |
| CAPA | |
| C125 | |
| C126 | |
| C140 | |
| C202 | |
| C204 | |
| C206 | |
| C230 | |
| C232 | |
| C619, | |
| C621, | |
| C903 | |
| C904 | |
| TRAN | |
| Q201 | |
| Q202, | |
| Q204 | |
| Q903, | |
| DIOD | |
| D917 | |
| VARI | |
| CT202 | |
| COIL | |
| L203 | |
| L204 | |
| L205 | |
| L206 | |
| T701 | |
| SWIT | |
| S912 | |




# ■ REPLACEMENT PARTS LIST

**Notes:** * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

* Bracketed indications in Ref. No. columns spe
area.
Parts without these indications can be used
areas.
* Ⓜ mark stands for that the parts are supplied in

## • Change of Parts List (SA-180 from SA-180L)

| Ref. No. | Change of Part No. SA-180L [EK] | → SA-180 [EX, EH, EI] | Part Name & Description | Pcs/ Set | |
|---|---|---|---|---|---|
| RESISTORS | | | | | |
| R201 | ERDS2TJ103 | —— | | — | De |
| R202 | ERDS2TJ182 | —— | | — | De |
| R203 | ERDS2TJ223 | —— | | — | De |
| R204 | ERDS2TJ822 | **ERDS2TJ102** | 1kΩ | (1) | |
| R206 | ERDS2TJ473 | —— | | — | De |
| R207 | ERDS2TJ102 | **ERDS2TJ821** | 820Ω | (1) | |
| R222 | ERDS2TJ122 | —— | | — | De |
| R246 | ERDS2TJ102 | —— | | — | De |
| R634 | ERQ12HJ820 | —— | | — | De |
| R700 | ERDS2TJ560 | —— | | — | De |
| R712 | ERDS1FJ821 | **ERDS1FJ152** | 1.5kΩ | (1) | |
| R720 | ERDS1FJ681 | —— | | — | De |
| R904 | ERDS2TJ153 | —— | | — | De |
| R906 | ERDS2TJ332 | —— | | — | De |
| R911 | ERDS2TJ102 | —— | | — | De |
| CAPACITORS | | | | | |
| C125 | RCBS1H6R8KCY | **RCBS1H100JCY** | 10pF | (1) | |
| C126 | RCBS1H2R7KCY | **RCBS1H1R8MCY** | 1.8pF | (1) | |
| C140 | ECKD1H103PF | **ECBS1C103NYY** | 0.01μF | (1) | |
| C202 | ECCD1H180KC | **RCBS1H120JCY** | 12pF | (1) | |
| C204 | ECQP1391JZ | —— | | — | De |
| C206 | ECKD1H223PF | —— | | — | De |
| C230 | —— | **ECKD1H223ZF** | 0.022μF | (1) | Ac |
| C232 | ECEA1CU100 | **ECEA1HU010** | 1μF | (1) | |
| C619, 620 | ECFTD104KXL | **ECKD1H473ZF** | 0.047μF | (2) | |
| C621, 622 | ECFTD104KXL | —— | | — | De |
| C903 | ECEA1HU010 | —— | | — | De |
| C904 | ECKD1H223PF | —— | | — | De |
| TRANSISTORS | | | | | |
| Q201 | 2SA1175FE | —— | | — | De |
| Q202, 203 | 2SC2785F | —— | | — | De |
| Q204 | 2SC2785F | —— | | — | De |
| Q903, 904 | 2SC2785F | —— | | — | De |
| DIODE | | | | | |
| D917 | 1SS254 | —— | DIODE | — | De |
| VARIABLE CAPACITOR | | | | | |
| CT202 | ECRHA020D41 | —— | POLYTHYLENE CAPACITOR | — | De |
| COILS AND TRANSFORMER | | | | | |
| L203 | SLA2B3-P | —— | ANTENNA COIL | — | De |
| L204 | SLA1B7R-P | **SLA2B1-1M** | ANTENNA COIL | (1) | |
| L205 | SLO2B9R-P | **SLO2B7-M** | OSCILLATOR COIL | (1) | |
| L206 | SLO1B5-P | —— | OSCILLATOR COIL | — | De |
| T701 | SLT5M467 | **SLT5M466** | POWER TRANSFORMER | (1) | |
| SWITCH | | | | | |
| S912 | SSG13 | —— | | — | De |